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VOL IV

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NUCLEAR EXPLOSION INTERACTION STUDIES

Volume IV

Material Property Codes

J. R. Triplett et al.
Gulf General Atomic Incorporated
San Diego, California 92112

Contract No. F29601-67-C-0014

TECHNICAL REPORT NO. AFWL-TR-67-131, VOL IV

April 1968

AIR FORCE WEAPONS LABORATORY
Air Force Systems Command
Kirtland Air Force Base
New Mexico

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FOREWORD

This report was prepared by Gulf General Atomic Incorporated, San Diego, California, under Contract F29601-67-C-0014. The research was funded by DASA under Project 5710, Subtask 07.017, Program Element 6.16.46.01H, and by ARPA Order 313, Program Element 6.25.03.01R.

Inclusive dates of research were 29 September 1966 to 27 October 1967. The report was submitted 13 March 1968 by the Air Force Weapons Laboratory Project Officer, Major John Bode (WLRT).

This report is published in four volumes: Volume I, Laser Phenomenology (classified CONFIDENTIAL); Volume II, Two-Dimensional Code Development; Volume III, The OUTPUT Code; and Volume IV, Material Property Codes. The first volume contains a classified report on interaction of laser radiation with solid targets and a brief description of calculations done in conjunction with experiments at the Air Force Weapons Laboratory. The remaining three volumes contain reports of code development efforts in the areas of radiative transfer, hydrodynamics, radiative absorption coefficients, and equations of state.

The projects described in this report are for the most part in an incomplete state of development. This is due in part to the nature of the existing computer programs themselves, which continue in a state of development as long as they are in use, and in part to the time scale involved in bringing new programs to a state of capability for solving real problems.

Gulf General Atomic staff personnel responsible for the direction of the research include J. H. Alexander, R. Brightman, R. S. Englemore, B. E. Freeman, W. B. Lindley, L. Norris, J. T. Palmer, L. M. Schalit, J. R. Triplett, and Mrs. Chris Imes. Contractor's report number is GA-7764, Vol IV.

The cooperation of Dr. P. V. Avizonis, Major J. Bode, Capt C. C. David, Major G. Spillman, and Lt L. Stoessel of AFWL is gratefully acknowledged.

Other documents produced under this contract are: GAMD-7592, " A Numerical Scheme for First-Order Compton Scattering," J. T. Palmer, December 13, 1966; GAMD-7846, "Difference Equations for Heat Flow in Two Dimensions," J. R. Triplett, March 2, 1967; GAMD-7879, "A Modified Characteristic Method for Radiative Transfer," J. R. Triplett, March 17, 1967; GAMD-7889, "R D C D. A FORTRAN Input Routine," J. H. Alexander, March 24, 1967; GAMD-8333, "Hydrodynamic Equations

for Multidimensional Problems," J. R. Triplett, October 24, 1967; GAMD-8379, "A Brief Study of the Thermodynamic Properties of Several Low Z Elements at Low Temperature," L. M. Schalit, November 22, 1967.

This technical report has been reviewed and is approved.

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ABSTRACT

(Distribution Limitation Statement No. 2)

The work covered by this volume falls into three parts: (1) opacity data generated by the DIAPHANOUS code; (2) equation-of-state-data generated by the SPUTTER/HECTIC subroutines AIRMOL and CMOL and the MARIER, HELAS, and HELIKE ionization potential routines; (3) descriptions of codes used to transfer data between LASL, AFWL, Gulf General Atomic, and the DASA Analysis and Information Center (DASIAC).

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FIGURES

TABLES

NOTATIONS

$A_\alpha, B_\alpha, C_\alpha, D_\alpha, E_\alpha$	Coefficients for least-squares fit of enthalpy for species α
C_α	Concentration of species α in moles/cc; also used as above
E^o_α	Internal energy (cal mole) of species α at temperature T, one atmosphere
E_{sp}	Specific energy of gas mixture, cal/gm or erg/gm
G^o_α	Gibbs free energy (cal mole) of species α at temperature T, one atmosphere
H^o_α	Enthalpy of species α at temperature T, one atmosphere
$H^o_{0,\alpha}$	Heat of formation of species α at 0^oK, one atmosphere; stable molecules N_2, O_2, and A taken as reference state
K_1, K_2, K_3	Equilibrium constants in units of pressure for the reactions $N_2 \rightleftarrows 2N$, $O_2 \rightleftarrows 2O$, and $NO \rightleftarrows N + O$ respectively
k_α	Integration constant needed to relate Gibbs free energy to enthalpy with polynomial expression
M	Mean atomic weight of air, about 14.55 gm/mole
M^o	Mean molecular weight of air at standard temperature and pressure (STP), about 29 gm/mole
$\overline{N}$	Mean number of atoms per molecule for the mixture
P	Total pressure; units will be either atmospheres or dynes/cm^2 to be consistent with context
P_α	Pressure for species α
Q	Classical partition function
R	Gas constant, units vary according to context used

NOTATIONS (continued)

T	Temperature in ^{o}K
V	Volume in cc
X_A^o	Atom fraction of argon in air at STP
X_O^o	Atom fraction of oxygen in air at STP
X_N^o	Atom fraction of nitrogen in air at STP
$(\Delta G_T^o)_j$	Change in Gibbs free energy for the j^{th} reaction at temperature T, one atmosphere
η_α	Number of atoms in molecule α
θ	Temperature in eV
ρ	Density in gm/cc
τ	Specific volume in cc/gm; $\tau = \rho^{-1}$
ϕ	Gas constant in SPUTTER units

SECTION I

INTRODUCTION

The NEIS contract has called for the continued development of the material properties representations used by the SPUTTER, MOTET, HECTIC, and other radiation transport and hydrodynamics codes used in the study of the interactions due to nuclear explosions.

The material properties data and codes that have been developed during this contract are, in large part, connected with the need to improve the opacity formulations used by the above-mentioned codes. The MOTET and HECTIC codes formerly had to use hand-computed fits to the opacities; it is now possible for them to use a data tape containing "grey" opacities. This tape contains data for over 30 different materials.

Techniques for efficient transfer of opacity data have been extensively developed and have been used to transfer such data between Los Alamos Scientific Laboratory, Gulf General Atomic, Air Force Weapons Laboratory, and the Defense Atomic Support Agency Information and Analysis Center (DASIAC). DASIAC has been supplied with a full set of the opacity data generated at Gulf General Atomic.

Descriptions of the numerous codes used to transfer information to DASIAC and other installations have been included in this volume. (The code listings and a discussion of the data formats are included.)

Extensive summaries of the opacity data computed using the DIAPHANOUS code were prepared using codes described in this volume. These summaries are presented in a separate report (Ref. 1).

The EIONX code (used for SPUTTER and HECTIC equation-of-state data) requires ionization potentials for the elements in the material under study. AUGEAS, a DIAPHANOUS input generator, also requires this data.

The MARIER, HELAS, and HELIKE codes were written to help satisfy this need. (This part of the continuing research effort has not yet been concluded.)

In this program Gulf General Atomic has used opacity data generated at Los Alamos Scientific Laboratory. Several codes had to be written before these data could be used by the SPUTTER code. These codes (ANDIMX and COMBO) are described in this volume.

SECTION II

DISCUSSION OF THERMODYNAMIC AND OPACITY PLOTS AND DIAPHANOUS DATA TABULATIONS

The plots and tabulations reported in reference 1 are of the thermo dynamic and opacity data calculated by using the DIAPHANOUS code. In most respects the DIAPHANOUS code is similar to the one discussed in references 2 and 3. A few minor modifications and program corrections have been made, which will be discussed in greater detail in a series of follow-on volumes to the report of reference 2. The follow-on reports will also present the absorption coefficient plots as a function of frequency for the thermodynamic properties of materials presented in reference 1.

The data presented are consistent with a model of a monatomic ionizing gas. Other assumptions made are discussed (Ref. 2).

The elements for which data are presented (Ref 1) are:

Material No.	Material
1	Hydrogen
2	Helium
4	Beryllium
6	Carbon
10	Neon
13	Aluminum
18	Argon
26	Iron
29	Copper

(The material number is the atomic number.)

The (composite) multi-element materials are:

Material No.	Material
101	Polyethylene
102	Air
103	Teflon
105	Wet Tuff
106	Refrasil
108	Lithium Hydride
111	H - M - X
119	Grout
124	Playa
129	Average Shale
131	Average Limestone
134	Granite
136	Wet Alluvium
138	Sea Water

These material numbers are the same as those the SPUTTER subroutine EIONX uses in calculating the thermodynamic properties of an ionized gas. The compositions used by both DIAPHANOUS and EIONX are presented in tables I and II.

SPUTTER Material Numbers (as used by EIONX)

Material No.	Material
101	Polyethylene
102	Air
103	Teflon
104	Nylon-Phenolic A
105	Wet Tuff
106	Refrasil
107	Phenolic A
108	Lithium Hydride

Material No.	Material
109	Salt
110	Magnalium
111	H - M - X
112	Refrasil B
113	Phenolic B
114	Refrasil C
115	Carbon-Phenolic (R. Schlaug A)
116	Card Input Material 1
117	Card Input Material 2
118	Card Input Material 3
119	Roy Pauls Grout
120	Playa (R. T. Whittaker - AFWL)
121	Carbon-Phenolic (Mosen-Hays)
122	Refrasil-Phenolic (Mosen-Hays)
123	Lithium Deuteride
124	QPlaya-Calcium
125	DIAPHANOUS Air with Argon (R. T. Walsh)
126	Average Crust
127	Average Wood
128	Average Igneous Rock
129	Average Shale
130	Average Sandstone
131	Average Limestone
132	Average Sediment
133	N. T. Soil (Ref. AFWL-TR-65-171, 1966)
134	Granite (Mem. 97, Am. Geophys. Soc., Table 1. 1)
135	Hi Temp Epoxy-Novalac (Dow Chem. Co.)
136	Wet Alluvium (Ref. DuPont DP-1055)

Material No.	Material
137	Dry Alluvium (Ref. - Hugoniot Data from Sandia, SC-4903 (RR))
138	Sea Water (Handbook of Chemistry and Physics, Chemical Rubber Co., 45th ed. p. F82)
139	Lubri Seal, "HI Vacuum" (Source: A. H. Thomas Co., Philadelphia, Penn.)

TABLE I

DIAPHANOUS COMPOSITIONS FOR SPECIFIED MATERIAL NUMBERS

MATERIAL NO.	MATERIAL NAME	NOLMNT	Z	PART	Z	PART	Z	PART	Z	PART	Z	PART
101	Polyethylene	2	1	0.667	6	0.333						
102	Air	2	7	0.78	8	0.22						
103	Teflon	2	6	0.333	9	0.667						
105	Wet Tuff/Lo	3	1	0.305	8	0.497	14	0.198				
105	Wet Tuff/Hi	5	1	0.305	8	0.497	14	0.180	20	0.014	26	0.004
106	Refrasil	4	1	0.25	6	0.25	8	0.35	14	0.15		
108	Lithium Hydride	2	1	0.5	3	0.5						
111	H - M - X	4	1	0.286	6	0.143	7	0.286	8	0.286		
119	Grout	4	1	0.439	7	0.502	13	0.048	22	0.011		
124	Playa/Lo	4	1	0.221	6	0.049	8	0.536	14	0.197		
124	Playa/Hi	5	1	0.221	6	0.049	8	0.536	14	0.161	20	0.036
129	Shale	4	1	0.1029	8	0.6005	14	0.2562	26	0.0404		
131	Limestone	5	1	0.016	6	0.181	8	0.596	12	0.058	20	0.148
134	Granite/Lo	3	1	0.027	8	0.606	14	0.367				
134	Granite/Hi	5	1	0.027	8	0.606	12	0.106	14	0.206	22	0.055
136	Wet Alluvium	4	1	0.22	8	0.535	14	0.229	26	0.02		
138	Sea Water	5	1	0.6623	8	0.3311	11	0.0032	17	0.0033	20	0.0001

NOLMNT: Number of elements
Z: Atomic number
PART: Number fraction

TABLE II

EIONX COMPOSITIONS FOR SPECIFIED MATERIAL NUMBERS

MATERIAL NUMBER	NOLMNT	Z	PART	Z	PART	Z	PART	Z	PART	Z	PART
101	2.	1.	0.66666667	6.	0.33333333						
102	3.	7.	0.78467	8.	0.21062	18.	0.00471				
103	2.	6.	0.33333333	9.	0.66666667						
104	4.	1.	0.5625	6.	0.34375	7.	0.03125	8.	0.0625		
105	5.	1.	0.31	8.	0.497	13.	0.033	14.	0.1367	19.	0.023
106	4.	1.	0.25	6.	0.25	8.	0.35	14.	0.15		
107	3.	1.	0.45454545	6.	0.45454545	8.	0.09090909				
108	2.	1.	0.5	3.	0.5						
109	2.	11.	0.5	17.	0.5						
110	2.	12.	0.3	13.	0.7						
111	4.	1.	0.28571428	6.	0.14285714	7.	0.28571428	8.	0.28571428		
112	4.	1.	0.19136	6.	0.2392	8.	0.39026	14.	0.17918		
113	3.	1.	0.414	6.	0.517	8.	0.069				
114	5.	1.	0.248	5.	0.007	6.	0.292	8.	0.321	14.	0.132
115	3.	1.	0.179	6.	0.779	8.	0.042				
119	5.	1.	0.4282	6.	0.3264	7.	0.02697	8.	0.1602	14.	0.05626
120	5.	1.	0.22	6.	0.049	8.	0.535	14.	0.164	20.	0.032
121	5.	1.	0.0272	6.	0.8631	7.	0.0078	8.	0.0922	26.	0.0097
122	5.	1.	0.023	6.	0.252	7.	0.003	8.	0.384	14.	0.337
123	2.	1.	0.5	3.	0.5						
124	5.	1.	0.221	6.	0.049	8.	0.536	14.	0.161	20.	0.036
125	3.	7.	0.785	8.	0.21	18.	0.005				
126	5.	8.	0.6255	13.	0.1095	14.	0.2122	20.	0.0336	26.	0.0192
127	3.	1.	0.473	6.	0.317	8.	0.21				
128	5.	1.	0.0266	8.	0.6064	12.	0.1065	14.	0.2059	22.	0.0546
129	4.	1.	0.1029	8.	0.6005	14.	0.2562	26.	0.0404		
130	5.	1.	0.0352	8.	0.6553	12.	0.0266	14.	0.2542	20.	0.0286
131	5.	1.	0.0164	6.	0.18139999	8.	0.5958	12.	0.0578	20.	0.1485
132	5.	1.	0.0687	8.	0.6279	12.	0.0699	14.	0.1865	20.	0.047
133	4.	1.	0.163	8.	0.558	14.	0.226	20.	0.053		
134	5.	8.	0.6399	13.	0.0854	14.	0.2392	19.	0.0251	26.	0.0104
135	3.	1.	0.4615	6.	0.4461	8.	0.0923				
136	4.	1.	0.22	8.	0.535	14.	0.229	26.	0.02		
137	4.	1.	0.083	8.	0.609	14.	0.281	26.	0.026		
138	5.	1.	0.6623	8.	0.3311	11.	0.0032	17.	0.0033	20.	0.0001
139	3.	1.	0.657	6.	0.342	8.	0.001				

Note that the compositions listed are not always identical. However, they are enough alike, in light of other concurrent approximations in the radiation-transport hydrodynamics codes, for the user to consider the opacity data (provided by DIAPHANOUS to SPUTTER) to be for the same material as the thermodynamic data (provided by EIONX to SPUTTER), when the same number is used as (1) the equation-of-state material number, specifier, and (2) the opacity material number specifiers in SPUTTER input.

DIAPHANOUS runs for a given material are usually done in two sets, a low-temperature set and a high-temperature set. It is now standard practice to run the temperatures 1, 1.5, 2.25, 3.4, 5., 7., 10., 15., 22.5, and 34. eV as the low-temperature set. Graphs made from such runs have the material name followed by /LO in their upper titles. Similarly, the standard high-temperature set comprises 50., 70., 100., 225., 340., 500., 700., 1000., and 2250. eV. Occasionally, more temperature values are added (3400., 5000., and 10,000. eV). These graphs have the material name followed by /HI in the upper title. In any case, the graphs plotted at a constant temperature on any given curve have a list of these temperatures (with their respective plotting symbol) just below the upper title. In addition, various dates, tape numbers, and other data are recorded in the plot titles for historical background.

The two independent variables in DIAPHANOUS runs are temperature, θ (in eV), and Γ, a dimensionless "electron degeneracy parameter,"

$$\Gamma \equiv \frac{2(2\pi\, m\, \theta)^{3/2}}{h^3 N_e}$$

where N_e is the number density of free electrons, m is the electron mass, and h is Planck's constant, and

$$(1/N_e) = \frac{(\overline{M^o}/N_a)}{\rho\, \overline{Z}}$$

where ρ is the density in gm/cc, $\overline{Z}$ is the mean ionization (i.e., mean ion charge), $\overline{M^o}$ is the mean atomic weight, and N_a is Avogadro's number of

molecules per mole. Thus $\overline{(M^o/N_a)}$ is the mean mass per molecule.

Then Γ is seen to be inversely proportional to both ρ and $\overline{Z}$:

$$\Gamma = \frac{2(2\pi m \theta)^{3/2}\overline{(M^o/N_a)}}{h^3 \rho \overline{Z}}$$

$$= c'\left(\frac{\theta^{3/2}}{\rho \overline{Z}}\right)\overline{M^o} \cong (0.01\,\theta^{3/2}\overline{M^o})/(\rho\overline{Z})$$

Γ is a natural variable for the DIAPHANOUS code; however, it is an inconvenient variable for intuitive physical reasoning since $\Gamma = \Gamma[\theta, \rho, \overline{Z}(\theta, \rho)]$ for a given material. For this reason, most of the plots have been done for the several dependent variables on curves of constant temperature. For completeness, some plots at constant Γ have been included for each material. The graphs at constant Γ have a list of the Γ values, along with the respective plotting symbol, just below the upper title.

For any given material, the plots are usually in two sets, a /LO set and a /HI set. Within a given set, a group of plots with curves at constant temperature are followed by a group of plots with curves at constant Γ. The y-axis labels are complete and self-explanatory with the exception of the quantity EGAM which is defined as

$$\text{EGAM} \equiv 1 + P/\rho E$$

where P is the pressure in dynes/cm^2, ρ is the density in gm/cc, and E is the specific internal energy in ergs/gm so EGAM is dimensionless. (The quantities ρ and E are the same quantities used in the other graphs and tabular data. P is in units of bars in the other graphs and in the tabular data.)

The plots are arranged in order of increasing material number. Refer to reference 1 for further information on the codes used.

The plots were produced by the following sequence of computer runs:

a. DYPER4 was run to produce plots of the absorption coefficient as a function of frequency and to punch summary cards of thermodynamic and opacity data.

b. GRAPH and TRANS were run using the above summary cards as input. Plot tapes were prepared for the SC-4020 plotter.

The tabulations following the plots were produced by the DLISTR program from the summary cards.

INTRODUCTION TO DISCUSSION OF MATERIAL PROPERTIES SUBROUTINES AND DATA PROCESSING CODES

The following code descriptions are of some of the computer programs developed for and used in the material property calculations performed for this contract.

The codes discussed fall into two overlapping categories:

1. Codes used to generate the tabular or graphical data presented in reference 1. These include:

GOLEM, AIRMOL, DYPER4, GRAPH, TRANS, HELIKE, HELAS, LEVELS, TEDIUS, MARIER, MARIE, DLISTR, GREYS, and EGREY.

2. Codes that have been used in transferring opacity data from one installation to another. These codes have been used to process data from LASL, to supply data to AFWL, and most recently, to create sizeable quantities of stored opacity data at the DASA Information and Analysis Center (DASIAC) in Santa Barbara, California. These include:

DENSER, DASE, DAPHNE, ANDIMX, COMBO, DIANE, DIANTC, DIANCT, DYPDIN, GREYS, EGREY, REDGRE, DLISTR, LEVELS, TEDIUS, EDSILV, DYPER4, GRAPH, and TRANS.

Some applications of the codes discussed in this volume are given in reference 1.

SECTION III

EQUATION-OF-STATE DATA AND CODES

A description of the physics and programming techniques used in the SPUTTER/HECTIC molecular air equation-of-state subroutine AIRMOL, and a description of several codes used to generate needed ionization potentials for the EIONX subroutine is presented in this section.

Several accessory codes (such as GOLEM) are also described.

AIRMOL: A MOLECULAR EQUATION-OF-STATE SUBROUTINE FOR AIR

The computer subroutine AIRMOL develops a molecular equation-of-state for air in thermodynamic equilibrium from room temperature to 25,000°K over a density range of 10 gm/cc to 10^{-7} gm/cc. Enthalpies and free energies are obtained from analytic fits of tabulated data. The system composition is derived from conservation relations and reaction equations. The thermodynamic variables E, P, $(\partial E/\partial \theta)_T$, $(\partial E/\partial \tau)_\theta$, $(\partial P/\partial \theta)_T$, and $\overline{N}$ are the final output of the code. These are transferred to the EIONX code, which calculates all translation and ionization quantities. These two subroutines are used in the SPUTTER code, which is a general purpose one-dimensional radiation and fluid mechanics program.

```
      SUBROUTINE AIRMOL(THETA,TAU,FESTER)
C
C
C                GLOSSARY FOR AIRMOL
C
C     ***************************************************************
C     *          DEDTAU     SAME AS    CARBNZ(3)                    *
C     *          DEDTHT     SAME AS    CARBNZ(4)                    *
C     *          DPDTAU     SAME AS    CARBNZ(5)                    *
C     *          DPDTHT     SAME AS    CARBNZ(6)                    *
C     *          EDIS       SAME AS    CARBNZ(1)                    *
C     *          NBAR       SAME AS    EION(17)                     *
C     ***************************************************************
C
C     A(6)       POLYNOMIAL COEFICIENT FOR ENTHALPY.
C     A1         XREFN*RHO. THE TOTAL NUMBER OF N ATOMS (IN MOLE/CC) AT
C                ANY TEMPERATURE AND PRESSURE.
C     AEST       2.*EST
C     B(6)       POLYNOMIAL COEFICIENT FOR ENTHALPY.
C     BARK(6)    INTEGRATION CONSTANT FOR FREE ENERGY IF ENTHALPY IS
C                POLYNOMIAL
C     BARK2(6)   INTEGRATION CONSTANT FOR FREE ENERGY IF ENTHALPY IS
C                5/2R(
C     C(6)       POLYNOMIAL COEFICIENT FOR ENTHALPY.
C     CON(6)     CONCENTRATION, MOLES/CC.
C     D(6)       POLYNOMIAL COEFICIENT FOR ENTHALPY.
C     D1         SQRT(CON(N2))
C     DCDT(6)    D(CON(I))/DT
C     DCDTAU(6)  D(CON(I))/DTAU
C     DEDT(6)    D(ESPECZ(I))/DT
C     DEDTAU     D(EDIS)/DTAU
C     DEDIS      D(EDIS)/DT
C     DEDTHT     D(EDIS)/DTHETA
C     DELH(6)    ENTHALPY AT ONE ATMOSPHERE, ZERO DEGREES KELVIN, 'HEAT
C                OF FORMATION AT REFERENCE STATE', CALORIE/MOLE.
C     DGDT(6)    D(FRENRG(I))/DT.
C     DKP1DT     D(KP1)/DT
C     DKP2DT     D(KP2)/DT
C     DKP3DT     D(KP3)/DT
C     DNDT       D(NBAR)/DT
C     DNOM       DENOMINATOR IN DETERMINANT EQUATS. FOR  D(CON(I))/DT
C                AND  D(CON(I))/DTAU
C     DPDTAU     D(PRESHR)/DTAU = -PRESHR/NBAR*D(NBAR)/DTAU
```

```
C       DPDTHT      -PRESHR * D(NBAR)/DT *(DT/DTHETA)/NBAR . DP/DTHETA
C                   WITHOUT  P/THETA TERM
C       E(6)        POLYNOMIAL COEFFICIENT FOR ENTHALPY.
C       E1          2*R2TKEL/KP2
C       EDIS        ENERGY -3/2*PHI*(1/NBAR)*THETA.  TOTAL SPECIFIC ENERGY
C                   DUE TO DISSOCIATION.
C       ENERGY      TOTAL SPECIFIC ENERGY, ERG/GM
C       ESPECZ(6)   INTERNAL ENERGY AT TKEL, ONE ATMOSPHERE, CAL/MOLE
C       EST         ESTIMATE AT RATIO CON(NO)/CON(N2) BEFORE ITERATION START
C       EZ          TOTAL DIMENSIONLESS ENERGY. E/RT
C       F1          1 + CON(NO)/KP3*R2TKEL
C       FRENRG(6)   (FREE ENERGY AT TKEL)/(R*TKEL), DIMENSIONLESS
C       HSPECZ(6)   ENTHALPY AT TKEL, ONE ATMOSPHERE, CAL./MOLE
C       KP1         EQUILIBRIUM CONSTANT IN PRESSURE UNITS FOR N2=2N
C       KP2         EQUILIBRIUM CONSTANT IN PRESSURE UNITS FOR O2=2O
C       KP3         EQUILIBRIUM CONSTANT IN PRESSURE UNITS FOR N+O=NO
C       MARK        CALLING PARAMETER
C                   - INCLUDE  ELECTRONIC  EXCITATION FOR ATOMS
C                   + NO ELECTRONIC EXCITATION FOR ATOMS
C                   0 LIKE +, ALSO PRINTOUT DEBUG QUANTITIES IN AIRMOL
C       MOFRCT(6)   MOLE FRACTION
C       NBAR        MEAN NUMBER OF ATOMS PER MOLECULE FOR GAS MIXTURE
C       NITER       ITERATION COUNTER
C       NONOR1      0 IF ENTHALPY/RT IS CONSTANT FOR ATOMS, 1 IF ENTHALPY/RT
C                   IS POLYNOMIAL
C       OLDX(6)     CONCENTRATION OF PREVIOUS ITERATION
C       PHI         9.649E11/WTREF
C       PO          TOTAL PRESSURE, ATMOSPHERES
C       PRESHR      TOTAL PRESSURE, DYNE/CM**2
C       RHO         DENSITY, GM/CC
C       RH1,RH2     RIGHT HAND SIDE OF DETERMINANT EQUATS. FOR D(CON(I))/DTAU
C       RH3-5       RIGHT HAND SIDE OF DETERMINANT EQUATS. FOR D(CON(I))/DT
C       RTKEL       R*TKEL, R=1.98726 CAL/MOLE/DEG
C       R2TKEL      R*TKEL, R=82.054 CC*ATM/MOLE/DEG
C       RT2         R2TKEL**2
C       SCDE        SUM OF D(ESPECZ(I))/DT * CON(I)
C       SCE         SUM OF D(CON(I))/DT * ESPECZ(I)
C       SDT         SUM OF D(CON(I))/DT
C       SDTAU       SUM OF D(CON(I))/DTAU
C       SNC         TOTAL NUMBER OF ATOM PER CC. SUM OF N(I)*CON(I), WHERE
C                   N(I) IS ATOM/MOLECULE
C       SNDTAU      SUM OF N(I)*D(CON(I))/DTAU. N(I)=ATOM/MOLECULE
C       SUMCON      SUM OF ALL CON(I), MOLE/CC
C       SUMNRG      TOTAL ENERGY, CAL/CC.  SUM OF CON(I)*ESPECZ(I)
C       TAU         SPECIFIC VOLUME, CC./GM.
C       THETA       TEMPERATURE, EV.
C       TKEL        TEMPERATURE, DEGREES KELVIN
C       TKELN       ALOG(TKEL)   NATURAL  LOG
C       TRM1        KP1/R2TKEL
C       TRM2        A1-CON(NO)
C       VV          XRLFO*RHO. THE TOTAL NUMBER OF O ATOMS (IN MOLE/CC) AT
C                   ANY TEMPERATURE
C       V1,V2,V3    CHANGE IN (FREE ENERGY/RT) FOR REACTIONS N2=2N, O2=2O,
C                   AND  N+O=NO RESPECTIVELY
C       WTREF       ATOMIC WEIGHT OF AIR AT STP, ABOUT 14.55 GM/MOLE
```

```
C       XREFA      MOLE FRACTION OF A ATOMS/MEAN ATOMIC WEIGHT AT STP
C       XREFO      MOLE FRACTION OF O ATOMS/MEAN ATOMIC WEIGHT AT STP
C       XREFN      MOLE FRACTION OF N ATOMS/MEAN ATOMIC WEIGHT AT STP
C
C
        COMMON/LMS/EION(20)
        EQUIVALENCE (NBAR,EION(17))
        COMMON/LMSG/CARBNZ(10)
        DIMENSION AIR(10)
        EQUIVALENCE(AIR(1),CARBNZ(1) )
        EQUIVALENCE (AIR(1),EDIS),(AIR(3), DEDTAU) , (AIR(4),DEDTHT),
       * (AIR(5),DPDTAU) , (AIR(6),DPDTHT)
        DIMENSION A(6), B(6), C(6), D(6), E(6), BARK(6), BARK2(6), CON(6)
       *          ,DELH(6),OLDX(6),FRENRG(6),HSPECZ(6),ESPECZ(6),MOFRCT(6)
        DIMENSION                  DCDT(6), DCDTAU(6), DEDT(6), DGDT(6)
        REAL KP1, KP2, KP3, MOFRCT, NBAR
        DATA XREFN, XREFO, XREFA/5.3929E-2, 1.4476E-2, 3.237E-4/
        DATA WTREF/14.55/,  AIR (8)/0./,PHI/6.63E10/
        DATA A/3.39032, 3.48754, 3.02986, 2.54395, 2.66918, 2.49716/
        DATA B/3.26691E-4, 3.33691E-4, 2.39195E-4, - 7.03288E-5, -
       *6.76606E-5, 2.06980E-6/
        DATA C/-4.43869E-8, - 3.26154E-8, - 2.68348E-8, 2.10493E-8,
       *1.16238E-8, - 2.90268E-10/
        DATA D/2.84212E-12, 1.78842E-12, 1.46612E-12, - 1.23848E-12, -
       *6.49696E-13, - 2.16444E-15/
        DATA E/-5.61017E-17, - 3.45129E-17, - 2.88536E-17, 2.27227E-17,
       *1.25238E-17, 1.16325E-18/
        DATA DELH/0., 0., 21476.5, 112579.5, 58986.5, 0./
        DATA BARK/3.47421, 4.63168, 4.44607, 3.99389, 4.12663, 4.37850/
        DATA BARK2/1., 1., 1., 4.48452, 5.26387, 4.37217/
        DATA EREF/2.699E11/
C
C
        MARK=FESTER+.5
C
        TKEL = 11605.4*THETA
        RHO = 1./TAU
        RTKEL = 1.98726*TKEL
        R2TKEL = 82.054*TKEL
        RT2 = R2TKEL**2
        TKELN = ALOG(TKEL)
        DO 3 I = 1,6
        DCDT(I) = 0.
        CON(I) = 0.
      3 DCDTAU(I) = 0.
        PRESHR = 0.
        SUMNRG = 0.
        ENERGY = 0.
        PO = 0.
        EZ = 0.
        DEDTAU = 0.
        DPDTHT = 0.
        DPDTAU = 0.
        DEDTHT = 0.
        KP1 = 0.
```

```
      KP2 = 0.
      KP3 = 0.
      IF (TKEL .LT. 25000.) GO TO 1
      EDIS = 2.899E11 - EREF
      NBAR = 1.
      GO TO 1000
    1 CONTINUE
      IF (RHO .LT. 10.1) GO TO 2
         AIR(8) = 96.0001
      RETURN
    2 CONTINUE
C
C               COMPUTE ENTHALPY, FREE ENERGY, AND DEDT(I), AND DGD(I)
C
      L=3
      IF (MARK .LT. 0) L=6
   10 CONTINUE                                                          AIRM 380
      DO 15 I = 1, L                                                    AIRM 390
      HSPEC2(I) = RTKEL*(A(I) + TKEL*(B(I) + TKEL*(C(I) + TKEL*(D(I) +  AIRM 400
     * TKEL*E(I))))) + DELH(I)                                          AIRM 410
      DEDT(I) = HSPEC2(I)/TKEL + 1.98726*(-1. + TKEL*(B(I) + TKEL*(2.*C(AIRM 420
     * I) + TKEL*(3.*D(I) + TKEL*(4.*E(I))))))                          AIRM 430
      FRENRG(I) = A(I)*(1. - TKELN) - (BARK(I) + TKEL*(B(I) + TKEL*(C(I)AIRM 440
     * /2. + TKEL*(D(I)/3. + TKEL*E(I)/4.)))) + DELH(I)/RTKEL           AIRM 450
   15 DGDT(I)=-(A(I)/TKEL  +B(I)+TKEL*(C(I)+TKEL*(D(I)+TKEL*E(I)))
     *          +DELH(I)/(RTKEL*TKEL))
      IF (MARK .LT. 0) GO TO 20
      DO 25 I = 4, 6                                                    AIRM 480
      HSPEC2(I)=2.5*RTKEL+DELH(I)
      DEDT(I) = 1.5*1.98726                                             AIRM 500
      FRENRG(I) = 2.5*(1. - TKELN) - BARK2(I) + DELH(I)/RTKEL           AIRM 510
   25 DGDT(I)=- (2.5+DELH(I)/RTKEL)/TKEL
   20 CONTINUE                                                          AIRM 520
C
C               ARGON CONCENTRATION.
C
      CON(6) = XREFA*RHO                                                AIRM 590
      NITER = 1                                                         AIRM 690
      IF (TKEL - 1200. .GT. -1.E-30) GO TO 60
C
C               LOW TEMPERATURE APPROXIMATION.
C
      CON(1)=2.6965E-2*RHO
      CON(2)=7.2379E-3*RHO
      DEDTHT = TAU*(DEDT(1)*CON(1) + DEDT(2)*CON(2) + DEDT(6)*CON(6))*
     1     4.184E7*11605.4 - 1.5*PHI/1.99
      GO TO 70                                                          AIRM 660
C
C               CALCULATE CONCENTRATION BY ITERATIVE METHOD.
C
   60 CONTINUE                                                          AIRM 670
C
C               EQUILIBRIUM CONSTANTS.
C
      V1 = 2.*FRENRG(4) - FRENRG(1)                                     AIRM 530
```

```
      KP1 = EXP(-V1)                                                    AIRM 540
      V2 = 2.*FRENRG(5) - FRENRG(2)                                     AIRM 550
      KP2 = EXP(-V2)                                                    AIRM 560
      V3 = FRENRG(4) + FRENRG(5) - FRENRG(3)                            AIRM 570
      KP3 = EXP(-V3)                                                    AIRM 580
C
C                 CALCULATE  CON(N2) BY ASSUMING CON(NO)/CON(N2) =EST
C
      EST = .01                                                         AIRM 680
      TRM1 = KP1/R2TKEL                                                 AIRM 700
      A1 = XREFN*RHO                                                    AIRM 710
      VV = XREFO*RHO                                                    AIRM 720
      E1 = 2.*R2TKEL/KP2                                                AIRM 730
  300 CONTINUE                                                          AIRM 740
C
C                 AFTER FIRST PASS, USE OLD VALUE OF CON(NO) IN EQUATION
C                 FOR CON(N2)
C
      IF (NITER .NE. 1)                                                 AIRM 750
     * GO TO 325                                                        AIRM 760
      AEST = 2. + EST                                                   AIRM 770
      D1 = 2.*A1/(SQRT(TRM1) + SQRT(AEST)*SQRT(TRM1/AEST + 4.*A1))      AIRM 780
      GO TO 330                                                         AIRM 790
  325 CONTINUE                                                          AIRM 800
      TRM2 = A1 - CON(3)                                                AIRM 810
      IF (TRM2 .LT. 0.)                                                 AIRM 820
     * TRM2 = 0.                                                        AIRM  30
      D1 = 2.*(A1 - CON(3))/(SQRT(TRM1) + SQRT(TRM1 + 8.*TRM2))         AIRM 840
C
C
  330 CON(1) = D1**2                                                    AIRM 850
C
C                 CON(N)
C
      CON(4) = SQRT(KP1)*SQRT(CON(1)/R2TKEL)                            AIRM 860
      F1 = 1. + CON(4)/KP3*R2TKEL                                       AIRM 870
C
C                 CON(O)
C
      CON(5) = 2.*VV/(F1 + SQRT(F1**2 + 4.*E1*VV))                      AIRM 880
C
C                 CON(O2)
C
      CON(2) = CON(5)**2/KP2*R2TKEL                                     AIRM 890
C
C                 CON(NO)
C
      CON(3) = CON(4)*CON(5)*R2TKEL/KP3                                 AIRM 900
   70 CONTINUE                                                          AIRM 910
      SUMCON = 0.                                                       AIRM 920
      DO 30 J = 1, 6                                                    AIRM 930
   30 SUMCON = SUMCON + CON(J)                                          AIRM 940
C
C                 MOLE FRACTIONS
C
```

```
      DO 35 J = 1, 6                                                    AIRM 950
   35 MOFRCT(J) = CON(J)/SUMCON                                         AIRM 960
      IF (MARK .NE. 0) GO TO 235
   75 WRITE (6, 210)MOFRCT, NITER                                       AIRM 970
  210 FORMAT (18HOMOFRCT(I), NITER,1P6E12.5,I5)                         AIRM 980
      WRITE (6, 220)CON                                                 AIRM 990
  220 FORMAT (7H CON(I),10X,1P6E12.5)
      WRITE (6, 230)SUMCON                                              AIRM1010
  230 FORMAT (7H SUMCON,1P6E12.6)                                       AIRM1020
  235 CONTINUE
C
C                FOR LOW TEMPERATURE, NO ITERATIONS
C
      IF (TKEL .LT. 1200.)                                              AIRM1030
     * GO TO 110                                                        AIRM1040
      IF (NITER .EQ. 1)                                                 AIRM1050
     * GO TO 310                                                        AIRM1060
C
C                TEST FOR CONVERGENCE
C
      TEST = ABS(OLDX(1) - CON(1))/OLDX(1)*100.                         AIRM1070
      IF (TEST .LT. .1)                                                 AIRM1080
     * GO TO 110                                                        AIRM1090
C
C                TEST IF ITERATION LIMIT EXCEEDED
C
      IF (NITER .GE. 10)                                                AIRM1100
     * GO TO 120                                                        AIRM1110
  310 DO 314 I = 1, 6                                                   AIRM1120
  314 OLDX(I) = CON(I)                                                  AIRM1130
      NITER = NITER + 1                                                 AIRM1140
C
C                ITERATE
C
      GO TO 300                                                         AIRM1150
  120    AIR(8) = 96.0120
      RETURN
  110 CONTINUE                                                          AIRM1180
C
C                THERMO, PROPERTIES OF MIXTURE
C
      SNC = 2.*(CON(1) + CON(2) + CON(3)) + CON(4) + CON(5) + CON(6)    AIRM1190
      PRESHR = 8.314E7*TKEL*SUMCON                                      AIRM1200
      NBAR = SNC/SUMCON                                                 AIRM1210
      DO 200 I = 1, 6                                                   AIRM1240
      ESPECZ(I) = HSPECZ(I) - RTKEL                                     AIRM1250
      EZ = EZ + MOFRCT(I)*ESPECZ(I)/RTKEL                               AIRM1260
  200 SUMNRG = SUMNRG + CON(I)*ESPECZ(I)                                AIRM1270
      ENERGY = TAU*SUMNRG*4.184E+7
      EDIS = ENERGY - 1.5*PHI*THETA/NBAR-EREF
      PO = R2TKEL*SUMCON                                                AIRM1290
C                                                                       AIRM1300
C         ***DERIVATIVES OF CONCENTRATIONS ***
C                                                                       AIRM1320
      IF (TKEL .LT. 1200.) GO TO 1000
```

```
C                                                                        AIRM1330
C               EQUILIBRIUM CONSTANTS DERIVATIVES
C                                                                        AIRM1350
      DV1DT=  -2.*DGDT(4) + DGDT(1)
      DV2DT = -2.*DGDT(5)+DGDT(2)
      DV3DT= -(DGDT(4)+DGDT(5))+DGDT(3)
      DKP1DT= KP1*DV1DT
      DKP2DT= KP2*DV2DT
      DKP3DT = KP3*DV3DT
C                                                                        AIRM1390
C               RIGHT HAND SIDE OF DET. EQUATS. FOR CONCENTRATION'S
C               DERIVATIVES
C                                                                        AIRM1410
      RH1 = -XREFN*RHO**2                                                AIRM1420
      RH2 = -XREFO*RHO**2                                                AIRM1430
      RH3 = CON(1)*DKP1DT - 82.054*CON(4)**2                             AIRM1440
      RH4 = CON(2)*DKP2DT - 82.054*CON(5)**2                             AIRM1450
      RH5 = CON(3)*DKP3DT - 82.054*CON(4)*CON(5)                         AIRM1460
C
C               CONCENTRATIONS DERIVATIVES
C
      XX = CON(4)*R2TKEL
      YY = CON(5)*R2TKEL
      ZZ = 4.*XX/KP1 + 1.
      DD = YY + KP3*ZZ
      WW = 2./(KP2*ZZ)
      DD1 = RH4 - KP2/KP1*RH3
      EE1 = RH5 + 2.*KP3/KP1*RH3
      DD2 = .5*KP2*(RH2 - RH1)
      EE2 = KP3*RH1
      A55 = XX + (2.*YY + .5*KP2)*DD*WW
      A56 = EE1 + WW*DD1*DD
      B56 = EE2 + WW*DD2*DD
      DCDT(5) = A56/A55
      DCDT(4) = WW*((2.*YY + .5*KP2)*DCDT(5) - DD1)
      DCDT(3) = 2.*RH3/KP1 - ZZ*DCDT(4)
      DCDT(2) = -.5*(DCDT(3) + DCDT(5))
      DCDT(1) = -.5*(DCDT(3) + DCDT(4))
      DCDTAU(5) = B56/A55
      DCDTAU(4) = WW*((2.*YY + .5*KP2)*DCDTAU(5) - DD2)
      DCDTAU(3) = RH1 - ZZ*DCDTAU(4)
      DCDTAU(2) = .5*(RH2 - DCDTAU(3) -DCDTAU(5))
      DCDTAU(1) = .5*( - DCDTAU(3) + (RH1 - DCDTAU(4)))
      DCDT(6) = 0.                                                       AIRM1770
      DCDTAU(6)=-CON(6)*RHO
C
C               THERMO. PROPERTIES DERIVATIVES
C
      SDT = DCDT(1) + DCDT(2) + DCDT(3) + DCDT(4) + DCDT(5) + DCDT(6)    AIRM1790
      SDTAU = DCDTAU(1) + DCDTAU(2) + DCDTAU(3) + DCDTAU(4) + DCDTAU(5)  AIRM180
     * + DCDTAU(6)                                                       AIRM1810
      SNDT = 2.*(DCDT(1) + DCDT(2) + DCDT(3)) + DCDT(4) + DCDT(5) + DCDTAIRM1820
     * (6)                                                               AIRM1830
      SNDTAU = 2.*(DCDTAU(1) + DCDTAU(2) + DCDTAU(3)) + DCDTAU(4) +      AIRM1840
     * DCDTAU(5) + DCDTAU(6)                                             AIRM1850
```

```
      DNDT = (SNDT - NBAR*SDT)/SUMCON
      DNDTAU = (SNDTAU - NBAR*SDTAU)/SUMCON
      IF (NBAR-1. .LT. 1.E-6) DNDTAU = DCDTAU(1) + DCDTAU(2) + DCDTAU(3)
      SCE = 0.
      SCUE = 0.
      FROG = 0.
      DO 405 I = 1, 6
      SCE = SCE + DCDT(I)*ESPECZ(I)
      FROG = FROG + DCDTAU(I)*ESPECZ(I)
  405 SCUE = SCUE + DEDT(I)*CON(I)
      DEDTAU = ENERGY*RHO + TAU*FROG*4.184E7
      DNRGDT = TAU*(SCE +SCUE)*4.184E7
      DEDTHT = DNRGDT*11605.4 - 1.5*PHI/NBAR
      DPDTHT = -PRESHR*DNDT*11605.4/NBAR
      DPDTAU = -PRESHR/NBAR*DNDTAU
C
C                DEBUG PRINTOUT
C
 1000 CONTINUE
      IF (MARK .NE. 0) RETURN
      CALL DVCHK (KALL)
      WRITE (6,1003) TKEL,RHO,MARK
      WRITE (6,1005) PRESHR,NBAR,SUMNRG,ENERGY,PO ,EZ
      WRITE (6,1006) EDIS,DEDTAU,DEDTHT,DPDTHT,DPDTAU,SUMCON
      WRITE (6,1004) KP1,KP2,KP3
      WRITE (6,1007) HSPECZ
      WRITE (6,1008) FRENRG
      WRITE (6,1021) DGDT
      WRITE (6,1009) ESPECZ
      WRITE (6,1010) MOFRCT
      WRITE (6,1011) CON
      WRITE(6,1017) DKP1DT, DKP2DT, DKP3DT
      WRITE (6,1018) RH1, RH2, RH3, RH4, RH5
      WRITE (6,1019) XX,YY,ZZ,A55,A56,B56
      WRITE (6,1020) DNDT, DNDTAU, DNRGDT, KALL
      WRITE (6,1015) DCDT
      WRITE (6,1016) DCDTAU
 1002 FORMAT (2E12.0,I12)
 1003 FORMAT (16H1TKEL,RHO,MATNUM,2E15.5,I10)
 1004 FORMAT (12H0KP1,KP2,KP3,3E15.5)
 1005 FORMAT (32H0PRESHR,NBAR,SUMNRG,ENERGY,PO,EZ,6E15.5)
 1006 FORMAT (40H0EDIS,DEDTAU,DEDTHT,DPDTHT,DPDTAU,SUMCON,6E15.5)
 1007 FORMAT (7H HSPECZ,6E15.5)
 1008 FORMAT (7H FRENRG,6E15.5)
 1009 FORMAT (7H ESPECZ,6E15.5)
 1010 FORMAT (7H MOFRCT,6E15.5)
 1011 FORMAT (4H CON,6E15.6)
 1015 FORMAT(5H0DCDT,6E15.5)
 1016 FORMAT (7H0DCDTAU,6E15.6)
 1017 FORMAT (11H DKP1-3/DT,3E15.5)
 1018 FORMAT (07H RH1-5,5E15.5)
 1019 FORMAT (22H XX,YY,ZZ,A55,A56,B56,6E15.5)
 1020 FORMAT (24H DNDT,DNDTAU,DNRGDT,KALL,3E15.6,I5)
 1021 FORMAT (6H DGDT ,6E15.5)
      RETURN

      END
```

System Compositon. The AIRMOL code considers a gas mixture composed of N_2, O_2, NO, N, O, and A in thermodynamic equilibrium. The first step in obtaining the thermodynamic properties of the mixture is to determine the composition as a function of temperature T and density ρ. The argon concentration can be found immediately, because it enters no chemical reactions:

$$C_A = \frac{X_A^o}{M} \rho \tag{1}$$

where X_A^o is the mole fraction of argon in air at STP; M is the mean atomic weight of the mixture, $\simeq$ 14. 55 gm/mole; C_A is the argon concentration in mole/cc; and ρ is the density in gm/cc.

Conservation Equations. Five concentrations are still unknown. Two equations can be written to express the conservation of nitrogen and oxygen atoms. (AIRMOL does not consider ionization.) For any temperature and density, the total number of moles of nitrogen atoms per cc is $X_N^o \rho/M$, where X_N^o is the mole fraction of nitrogen atoms in air at STP. The conservation equation is then

$$2\, C_{N_2} + C_N + C_{NO} = X_N^o \rho/M \tag{2}$$

where C_α is the concentration of species α in moles/cc. A similar equation applies to oxygen:

$$2\, C_{O_2} + C_O + C_{NO} = X_O^o \rho/M \tag{3}$$

Equilibrium Constants. The following three reactions are considered:

$$\begin{aligned} N_2 &\rightleftarrows 2N \\ O_2 &\rightleftarrows 2O \\ NO &\rightleftarrows N + O \end{aligned} \tag{4}$$

The equilibrium constants in dimensionless pressure units for these reactions are:

$$\left.\begin{aligned} K_1 &= \frac{P_N^2}{P_{N_2}} \\ K_2 &= \frac{P_O^2}{P_{O_2}} \\ K_3 &= \frac{P_N P_O}{P_{NO}} \end{aligned}\right\} \qquad (5)$$

(The usual conventions referencing the above pressures to the STP values are to be understood.)

Assuming that each species behaves as a perfect gas, the partial pressure for species α can be written

$$P_\alpha = n_\alpha \, RT/V \qquad (6)$$

where P_α is in atmospheres, n_α is the number of moles of species α, V is the volume in cc, and

$$R = 82.054 \text{ (atm-cc)/(mole-}^\circ\text{K)}$$

However, (n_α/V) is the concentration C_α. Substituting Eq. (6) into Eq. (5) yields equations that express the equilibrium constants in terms of the dimensionless concentrations:

$$\left.\begin{aligned} K_1 &= C_N^2 \, RT/C_{N_2} \\ K_2 &= C_O^2 \, RT/C_{O_2} \\ K_3 &= C_N \, C_O \, RT/C_{NO} \end{aligned}\right\} \qquad (7)$$

(The usual conventions referencing the above concentrations to the STP values are to be understood.)

Free Energies and Enthalpies. If the equilibrium constants are known as a function of T, then Eq. (7) and the conservation equations are five non-linear equations in the five unknowns (the concentrations). The equilibrium

constants can be written in terms of the change in the Gibbs free energy ΔG_T^o across the reaction:

$$K_j = \exp(-\Delta G_T^o / RT)_j \tag{8}$$

where the superscript o indicates a standard state of one atmosphere. To solve Eq. (8), one must know the Gibbs free energy, G_α^o, for each species. These are available from analytic fits of tabulated data produced by another code, SALLY. SALLY computes the classical partition function Q from basic molecular and atomic constants, then derives the enthalpy, free energy, etc.* A least-squares technique was used to fit the tabulated enthalpies to a fourth-order polynomial in T. The dimensionless enthalpy for species α is given by

$$\left(\frac{H_T^o - H_0^o}{RT}\right)_\alpha = A_\alpha + B_\alpha T + C_\alpha T^2 + D_\alpha T^3 + E_\alpha T^4 \tag{9}$$

H_T^o is the enthalpy at T °K, and one atmosphere. H_0^o is the enthalpy at 0 °K, one atmosphere. (Stable gas molecules N_2, O_2, and A are taken as reference states.) Thermodynamic consistency requires that the following relations hold:

$$-T \frac{d}{dT}\left(\frac{G_T^o - H_0^o}{RT}\right)_\alpha = \left(\frac{H_T^o - H_0^o}{RT}\right)_\alpha \tag{10}$$

So we must have, from Eqs. (9) and (10)

$$\left(\frac{G_T^o - H_0^o}{RT}\right)_\alpha = A_\alpha(1-\ln T) - B_\alpha T - C_\alpha T^2/2$$

$$- D_\alpha T^3/3 - E_\alpha T^4/4 + k_\alpha \tag{11}$$

---

*See any reference on thermodynamics and statistical mechanics, e.g., N. Davidson, Statistical Mechanics, New York, 1962.

The integration constant k_α is determined numerically by comparing the value of the free energy produced by SALLY and the polynomial value, Eq. (11), and finally taking an average k_α over the whole temperature range.

<u>Computer Solution of Composition</u>. With the free energies available, we can calculate the equilibrium constants. We then have five equations with known coefficients in the unknown concentrations; they are listed here as a group:

$$2\,C_{N_2} + C_N + C_{NO} = X_N^o\,\rho/M \tag{12a}$$

$$2\,C_{O_2} + C_O + C_{NO} = X_O^o\,\rho/M \tag{12b}$$

$$RT\,C_N^2 - K_1\,C_{N_2} = 0 \tag{12c}$$

$$RT\,C_O^2 - K_2\,C_{O_2} = 0 \tag{12d}$$

$$RT\,C_N C_O - K_3\,C_{NO} = 0 \tag{12e}$$

Solving Eq. (12c) for C_N and substitution in Eq. (12a) gives an equation in C_{N_2} and C_{NO}:

$$2\,C_{N_2} + (K_1\,C_{N_2}/RT)^{1/2} + C_{NO} = X_N^o\,\rho/M \tag{13}$$

It was observed from published data that over a large temperature and density range the ratio of C_{NO} to C_{N_2} is about 0.01. This fact is the basis of the beginning of an iterative solution for the concentrations. If 0.01 C_{N_2} is substituted for C_{NO} in Eq. (13), one is left with an equation in which only C_{N_2} is unknown:

$$2\,C_{N_2} + (K_1\,C_{N_2}/RT)^{1/2} + 0.01\,C_{N_2} = X_N^o\,\rho/M$$

After solving the above equation for C_{N_2}, we can solve Eq. (12c) for C_N:

$$C_N = (K_1 C_{N_2}/RT)^{1/2}$$

To solve Eq. (12b) for C_O, Eq. (12d) is used to eliminate C_{O_2}, and Eq. (12e) to eliminate C_{NO}. The result is

$$(2RT/K_2)\, C_O^2 + [1 + (C_N\, RT/K_3)]C_O = X_O^o \rho/M$$

After this is solved for C_O, Eq. (12d) is solved for C_{O_2}:

$$C_{O_2} = (RT/K_2)\, C_O^2$$

Iteration. To begin the calculation, it is assumed that $C_{NO} = 0.01\, C_{N_2}$. (C_{NO} has not been explicitly solved.) It is now calculated from Eq. (12e):

$$C_{NO} = RT\, C_N\, C_O/K_3$$

This completes the first iteration. The value just determined for C_{NO} is now used to solve Eq. (12a) again for C_{N_2}. The other concentrations are solved again in the same manner as the first iteration. After a new value for each concentration is obtained, some kind of convergence test must be made.

Convergence of Solution. Several methods were tried to determine the simplest way to test convergence and still ensure that all concentrations had changed less than some relative percent from their previous value. It was noted that C_{N_2} was always the last concentration to converge; hence, the criterion used in that C_{N_2} changed less than 0.1 percent for two successive iterations. Using values less than 0.1 percent did not improve the scheme. A limit of 10 iterations is set, but usually no more than 3 are required.

Thermodynamic Variables

The following variables are of interest.

$$P = RT \sum_{\alpha} C_{\alpha} \tag{14}$$

$$\left(\frac{\partial P}{\partial T}\right)_{\tau} = \frac{P}{T} + RT \sum_{\alpha} \left(\frac{\partial C_{\alpha}}{\partial T}\right)_{\tau} \tag{15}$$

$$\left(\frac{\partial P}{\partial \tau}\right)_{T} = RT \sum_{\alpha} \left(\frac{\partial C_{\alpha}}{\partial \tau}\right)_{T} \tag{16}$$

$$E_{sp} = \tau \sum_{\alpha} E^{o}_{\alpha} C_{\alpha} \tag{17}$$

$$\left(\frac{\partial E_{sp}}{\partial \tau}\right)_{T} = \sum_{\alpha} E^{o}_{\alpha} C_{\alpha} + \tau \left\{ \sum_{\alpha} E^{o}_{\alpha} \left(\frac{\partial C_{\alpha}}{\partial \tau}\right)_{T} \right\} \tag{18}$$

$$\left(\frac{\partial E_{sp}}{\partial T}\right)_{\tau} = \tau \left[\sum_{\alpha} C_{\alpha} \left(\frac{dE^{o}_{\alpha}}{dT}\right)_{\tau} + \sum_{\alpha} E^{o}_{\alpha} \left(\frac{\partial C_{\alpha}}{\partial T}\right)_{\tau} \right] \tag{19}$$

$$\overline{N} = \frac{\sum_{\alpha} \eta_{\alpha} C_{\alpha}}{\sum_{\alpha} C_{\alpha}} \tag{20}$$

η_{α} is the number of atoms in molecule α.

For $y = T$ or $y = \tau$

$$\frac{\partial \bar{N}}{\partial y} = \frac{\sum_{\alpha} \eta_{\alpha} \frac{\partial C_{\alpha}}{\partial y}}{\sum_{\alpha} C_{\alpha}} - \frac{\left(\sum_{\alpha} \eta_{\alpha} C_{\alpha}\right)\left(\sum_{\alpha} \frac{\eta_{\alpha} C_{\alpha}}{dy}\right)}{\left(\sum_{\alpha} C_{\alpha}\right)^2}$$

E_{sp} is the specific energy in cal/gm. E^o_{α} is the internal energy of species α for a standard state of one atmosphere. It is a function of T, but not of τ. The dE^o_{α}/dT derivatives are obtained from the fits for the enthalpy in Eq. (9). For a perfect gas

$$E^o_{\alpha} = H^o_{\alpha} - RT$$

$$= (A_{\alpha} + B_{\alpha} T + C_{\alpha} T^2 + D_{\alpha} T^3 + E_{\alpha} T^4) RT$$

$$+ H^o_{0,\alpha} - RT \tag{21}$$

$$\frac{dE^o_{\alpha}}{dT} = R(A_{\alpha} - 1 + 2B_{\alpha} T + 3C_{\alpha} T^2 + 4D_{\alpha} T^3 + 5E_{\alpha} T^4) \tag{22}$$

Internal Energy for Atoms. AIRMOL is a subroutine of EIONX. The latter calculates all electronic excitation and ionization contributions to the energy. To be consistent with EIONX, AIRMOL must not add in these terms. Thus, for atoms, the energy is simply:*

$$E^o_{\alpha} = 3\ RT/2 + H^o_{0,\alpha} \tag{23}$$

---

*An option is available in AIRMOL to include the electronic excitation terms. The third calling parameter would be set negative. This would be done if AIRMOL were coupled with a routine that did not calculate excitation and ionization for molecular species.

$$\frac{dE^{o}_{\alpha}}{dT} = 3\ R/2 \tag{24}$$

Concentration Derivatives. The concentration derivatives are obtained by differentiating the five equations, (12a-e), for C_α. If the equations are differentiated with respect to T or τ, the result is five linear equations in $\partial C_\alpha/\partial T$ or $\partial C_\alpha/\partial \tau$. The coefficients involve the C_α, but for a given T and ρ, the C_α have already been calculated. Hence, we have five linear equations in five unknowns with known coefficients:

$$\left.\begin{aligned}
2C'_{N_2} + C'_{N} + C'_{NO} &= J_1 \\
2C'_{O_2} + C'_{O} + C'_{NO} &= J_2 \\
2C_N\ RT\ C'_N - K_1\ C'_{N_2} &= J_3 \\
2C_O\ RT\ C'_O - K_2\ C'_{O_2} &= J_4 \\
C_O\ RT\ C'_N + C_N\ RT\ C'_O - K_3\ C'_{NO} &= J_5
\end{aligned}\right\} \tag{25}$$

The derivative C'_α may be with respect to either T or τ. The quantities J_i are known. If C'_α refers to $(\partial C_\alpha/\partial T)_\tau$, J_i is:

$$J_1 = J_2 = 0$$

$$J_3 = C_{N_2}\frac{dK_1}{dT} - C_N^2\ R$$

$$J_4 = C_{O_2}\frac{dK_2}{dT} - C_O^2\ R$$

$$J_5 = C_{NO}\frac{dK_3}{dT} - C_N C_O\ R$$

If C'_α refers to $(\partial C_\alpha/\partial\tau)_T$ then

$$J_3 = J_4 = J_5 = 0$$

$$J_1 = -X_N^o/M\tau^2$$

$$J_2 = -X_O^o/M\tau^2$$

The system given by Eq. (25) is solved by using the Gauss-Jordan method, which reduces the coefficient matrix to a triangular matrix.

Special Cases

If T is less than 1200°K or greater than about 25,000°K, limiting values may be introduced.

Low Temperature. For T less than 1200°K, the system composition is assumed to be the same as at room temperature. This is assumed valid for $\rho \geq 10^{-10}$ gm/cc. The mole fractions of N_2, O_2, and A are constant. The mole fractions of N, O, and NO are zero. $\overline{N}$ is therefore constant; hence, the derivatives of $\overline{N}$ with respect to T or τ are zero. As explained in the next section, the EIONX subroutine calculates the translational contributions to the pressure and energy derivatives. AIRMOL calculates the contributions due to changes in $\overline{N}$. Therefore, in the low-temperature limit the $(\partial P/\partial\tau)_T$, $(\partial P/\partial T)_\tau$, and $(\partial E_{sp}/\partial\tau)_T$ terms passed on from AIRMOL to EIONX are zero. However, the $(\partial E_{sp}/\partial T)_\tau$ term is not zero, because it contains contributions from terms such as $\partial E_\alpha^o/\partial T$. It follows from Eq. (19) that

$$\left(\frac{\partial E_{sp}}{\partial T}\right)_\tau = \tau \sum_\alpha C_\alpha \left(\frac{\partial E_\alpha^o}{\partial T}\right)_\tau \tag{26}$$

when T < 1200 °K.

High Temperature. The other extreme is to have T so great, or ρ so small, or both, that no molecules are left. Beyond this point the energy due to dissociation is constant. The nontranslational AIRMOL contributions to the derivatives $(\partial E/\partial T)_\tau$, $(\partial E/\partial \tau)_T$, $(\partial P/\partial T)_\tau$, and $(\partial P/\partial \tau)_T$ are all zero and $\overline{N} \equiv 1$.

Interface with Other Equation-of-State Subroutines

The SPUTTER code uses a general equation-of-state subroutine, EIONX, which interfaces with molecular equations-of-state as follows:

1. All ionization contributions are calculated by EIONX.
2. All translational contributions are calculated by EIONX.

While the equations written in this report have been given in terms of the temperature T in $^\circ$K, SPUTTER uses θ in eV for a temperature scale. Also, the reference state for the energy is not the same in AIRMOL and EIONX. The following steps must be taken before any quantities are passed on to EIONX from AIRMOL:

1. All quantities must be converted to a temperature scale of eV, θ.
2. The translational terms must be deleted.
3. A constant ΔE_{ref} must be added to the energy to have consistent reference states. (The value 2.899×10^{11} ergs/gm has been chosen.)

Six quantities are transferred from AIRMOL to EIONX by means of the arrays named CARBNZ and EION, which appear in named common. The quantities, and the cell of the array to which they are made equivalent, are listed here.

EDIS	=	CARBNZ(1)
DEDTAU	=	CARBNZ(3)
DEDTHT	=	CARBNZ(4)
DPDTAU	=	CARBNZ(5)
DPDTHT	=	CARBNZ(6)
NBAR	=	EION(17)

The above quantities are defined as follows:

$$\mathrm{EDIS} = E_{sp}\left(\frac{erg}{gm}\right) - \frac{3}{2}\frac{\phi\theta}{\overline{N}} + \Delta E_{ref}$$

$$\mathrm{DEDTAU} = (\partial E_{sp}/\partial\tau)_{\theta}$$

$$\mathrm{DEDTHT} = (\partial E_{sp}/\partial\theta)_{\tau} - \frac{3}{2}\frac{\phi}{\overline{N}}$$

$$\mathrm{DPDTHT} = (\partial P/\partial\theta)_{\tau} - \frac{P}{\theta}$$

$$\mathrm{DPDTAU} = (\partial P/\partial\tau)_{\theta} - \frac{P}{\tau}$$

$$\mathrm{NBAR} = \overline{N} = \frac{\sum_{\alpha} \eta_{\alpha} C_{\alpha}}{\sum_{\alpha} C_{\alpha}}$$

Coefficients for Least-Squares Fits

The dimensionless enthalpy $[(H^{o}_{\alpha} - H^{o}_{0\alpha})/RT]$ for each species was calculated by the SALLY code as a function of T. The data were then fit to a fourth-order polynomial in T by the NOLOUT code, which uses a least-square technique.

$$\left(\frac{H^{o}_{\alpha} - H^{o}_{0\alpha}}{RT}\right) = A_{\alpha} + B_{\alpha}T + C_{\alpha}T^{2} + D_{\alpha}T^{3} + E_{\alpha}T^{4}$$

Table III gives the coefficients in the above equation for the various species. Also listed are the integration constants k_{α} and k'_{α}, needed for the analytic expression, Eq. (11), for the Gibbs free energies. The term k_{α} is used if $(H^{o}_{\alpha} - H^{o}_{0\alpha})/RT = 5/2$ for the atomic species, while k'_{α} is used if the full polynomial expression is used.

TABLE III

COEFFICIENTS FOR VARIOUS SPECIES

	Coefficients						
	A_α	B_α	C_α	D_α	E_α	k_α	k'_α
N_2	3.39032	3.26691-4	-4.43869-8	2.84212-12	-5.61017-17	3.47421	---
O_2	3.48754	3.33691-4	-3.26154-8	1.78842-12	-3.45129-17	4.63168	---
NO	3.62986	2.39195-4	-2.68348-8	1.46612-12	-2.68536-17	4.44607	---
N	2.54395	-7.03288-5	2.10493-8	-1.23848-12	2.27227-17	3.99389	4.48452
O	2.66918	-6.76606-5	1.16238-8	-6.49696-13	1.25238-17	4.12663	5.26387
A	2.49716	2.06980-6	-2.90268-10	-2.16444-18	1.16325-18	4.37850	4.37217

Variables Used in AIRMOL

A(6)	Polynomial coefficients for enthalpy
A1	Total number of N atoms (in mole/cc) at any temperature and pressure
B(6)	Polynomial coefficients for enthalpy
BARK(6)	Integration constants for free energy if enthalpy is polynomial
BARK2(6)	Integration constants for free energy if enthalpy is 5RT/2
C(6)	Polynomial coefficients for enthalpy
CON(6)	Concentrations, moles/cc
D(6)	Polynomial coefficients for enthalpy
DCDT(6)	$(\partial C_\alpha / \partial T)_T$
DEDT(6)	dE^o_α / dT
DEDTAU	$(\partial E_{sp} / \partial \tau)_\theta$
DEDTHT	$(\partial E_{sp} / \partial \theta)_\tau - \rho\phi / N$
DELH(6)	$H^o_{0,\alpha}$, enthalpies at one atmosphere, $0\,^oK$
DGDT(6)	dG^o_α / dT
DKP1DT	dK_1 / dT
DKP2DT	dK_2 / dT
DKP3DT	dK_3 / dT
DNDT	$(\partial \bar{N} / \partial T)_\tau$
DPDTAU	$(\partial P / \partial \tau)_\theta - P/\tau$
DPDTHT	$(\partial P / \partial \theta)_\tau - P/\theta$
E(6)	Polynomial coefficients for enthalpy
EDIS	$E_{sp} - \frac{3}{2} \phi\,\theta / \bar{N}$, total specific energy due to dissociation
ENERGY	Total specific energy, erg/gm
ESPECZ(6)	Internal energies at T ^oK, one atmosphere, cal/mole
EZ	Total dimensionless energy, E/RT
FRENRG(6)	G^o_α / RT, dimensionless Gibbs free energies
HSPECZ(6)	Enthalpies at T ^oK, one atmosphere, cal/mole

KP1	Equilibrium constant in pressure units for $N_2 \rightleftharpoons 2N$
KP2	Equilibrium constant for $O_2 \rightleftharpoons 2O$
KP3	Equilibrium constant for $NO \rightleftharpoons N + O$
MARK	Third calling parameter for AIRMOL: if negative, include electronic excitation for atoms; if positive, no electronic excitation; if 0, like positive, and also print debug quantities in AIRMOL
MOFRCT(6)	Mole fractions
NBAR	Mean number of atoms per molecule in gas mixture
NITER	Iteration counter
OLDX(6)	Concentrations from preceding iteration
PHI	Gas constant (SPUTTER units), 9.649E11/WTREF
PO	Total pressure, atmospheres
PRESHR	Total pressure, dyne/cm^2
RHO	Density, gm/cc
RH1-RH5	Right-hand side of equations for derivatives of concentrations
RTKEL	RT, with R = 1.98726 cal/mole-$^{\circ}$K
R2TKEL	R_2T, with R_2 = 82.054 cc-atm/(mole-$^{\circ}$K)
RT2	$(R_2T)^2$
SCDE	$\sum_\alpha (dE^o_\alpha/dT)\, C_\alpha$
SCE	$\sum_\alpha (\partial C_\alpha/\partial T)_\tau$
SDTAU	$\sum_\alpha (\partial C_\alpha/\partial \tau)_T$
SNC	$\sum_\alpha \eta_\alpha C_\alpha$ where η_α is number of atoms per molecule; total number of atoms/cc
SNDTAU	$\sum_\alpha \eta_\alpha\, (\partial C_\alpha/\partial \tau)_T$
SUMCON	$\sum_\alpha C_\alpha$
SUMNRG	Total energy, cal/cc, $\sum_\alpha C_\alpha E^o_\alpha$

TAU	Specific volume, cc/gm
THETA	Temperature in eV
TKEL	Temperature in ^{o}K
TKELN	ℓn T, natural log
V1, V2, V3	$\Delta G_T^o / RT$ for the reactions (1) $N_2 \rightleftarrows 2N$; (2) $O_2 \rightleftarrows 2O$, and (3) $NO \rightleftarrows N + O$ respectively
WTREF	Mean atomic weight of air, about 14.55 gm/mole
XREFA	Mole fraction of argon atoms at STP, divided by mean atomic weight of air
XREFN	Mole fraction of nitrogen atoms at STP, divided by mean atomic weight of air
XREFO	Mole fraction of oxygen atoms at STP, divided by mean atomic weight of air

GOLEM: A TOOL TO STUDY EQUATION-OF-STATE AND OPACITY SUBROUTINES

The GOLEM code was developed to study the data computed by the equation-of-state and opacity subroutines (used in SPUTTER, MOTET, and other radiation-transport and hydrodynamic codes) that use temperature θ and density ρ (or specific volume $\tau \equiv 1/\rho$) as independent variables. GOLEM is an edit control code.

The GOLEM code input requirements are extremely simple. The sole input card format required is as follows:

```
      SUBROUTINE GOLEM
C ECT GOLEM/S0905,1,670905, 36292
      SUBROUTINE GOLEM
C **  LOAD KONTRL DECK FOR (MOLECULAR EQUATIONS OF STATE, ETC) PARAMETERS  **
C **  LOAD KONTRL DECK FOR (MOLECULAR EQUATIONS OF STATE, ETC) PARAMETERS  **
C **  LOAD KONTRL DECK FOR (MOLECULAR EQUATIONS OF STATE, ETC) PARAMETERS  **
C **  LOAD KONTRL DECK FOR (MOLECULAR EQUATIONS OF STATE, ETC) PARAMETERS  **
C **  LOAD KONTRL DECK FOR (MOLECULAR EQUATIONS OF STATE, ETC) PARAMETERS  **
C     THIS ROUTINE USABLE FOR TABULATION OF THERMODYNAMIC QUANITITIES
C*****************************************************************
C                                                                *
C*                  S P U T T E R   C O M M O N                 **
C*                                                              **
C*                                                              **
      COMMON   LMDA(37), NR     , NSMLR , IA     , IB     , ICA    , ICB    ,
     1   KMAX  , BLANK1, BLANK2, BLANK3, IAP1  , IBP1  , ICAP1 , ICBP1 ,
     2   II    , IG    , NRAD  , BLANK4, IAM1  , IBM1  , ICAM1 , ICBM1 ,
     3   IIP1  , IGM1  , IALPHA, BLANK5, IR    , IMAX  , BLANK6, DELPRI,
     4   FREQ  , CNTMAX, AR    , ASMLR , POSHA , POSHB , BOILA , BOILB ,
     5   CVA   , CVB   , SLOG  , ALPHA : HVA   , HVB   , HCA   , HCB   ,
     6   EMINA , EMINB , CA    , CB    , GA    , GB    , GL    , GR    ,
     7   RHOL  , RHOR  , EPIO  , EPSI  , RIA   , RIB   , ROIA  , ROIB  ,
     8   RPIA  , RPIB  , RPOIA , RPOIB , IPRINT, TA    , TB    , TC
      COMMON      TD   , TE    , DTH2  , DTH2P , DTH1  , DTRMIN, DTMAX ,
     1   DTMAX1, DTMAX2, DTMAX3, DTR   , SWITCH, CO    , CMIN  , DELTA ,
     2   GAMA  , WCRIT , SIGMAG, AC    , ACOST4, CNVRT , SOMRA , SOMRB ,
     3   ROIA  , ROIAM1, ROIB  , ROIBP1, GMS   , S1    , S2    , S3    ,
     4   S4    , S5    , S6    , S7    , S8    , S9    , S10   , S11   ,
     5   S12   , S13   , S14   , S15   , S16   , S17   , S18   , S19   ,
     6   S20   , EO    , FO    , TAU   , ZERO  , R    (152), DELTAR(152),
     7  ASQ   (152), RD    (152), VO    (152), ROD   (152), SMLR  (152),
     8  DELR  ( 37), P     (152), P1    (152), PB    (152), PB1   (152)
      COMMON         P2    (152), SV    (152), RHO   (152), THETA (152),
     1  W     (152), E     (152), E1    (152), EK    (152), X     (152),
     2  V     (152), G     (152), D     (152), C     (152), X2    (152),
     3  X3    (152), X4    (152), X5    (152), X6    (152), X7    (152),
     4  SMLA  (152), SMLB  (152), SMLC  (152), SMLD  (152), SMLE  (152),
     5  EC    (152), ER    (152), SMLG  (152), SMLH  (152), BIGA  (152),
     6  BIGB  (152), CV    (152), BC    (152), BR    (152), CHIC  (152),
     7  CHIR  (152), CAPAC (152), CAPAR (152), CRIC  (152), CRIR  (152),
     8  CRIPC (152), GOFR  (152), FEW   (152), CAR   (152), DKLM  ( 37)
      COMMON         TELM  ( 37), EKLM  ( 37), ELM   ( 37), FCLM  ( 37),
     1  FRLM  ( 37), WLM   ( 37), QLM   ( 37), AMASNO( 37), CHRNO ( 37),
     2  ZP1   ( 37), ZP2   ( 37), SOLID ( 37), ECHCK ( 37), RK    (104),
     3  RL    ( 37), RHOK  (104), RDK   (104), THETAK(104), TEMP  ( 16),
     4  HEAD  ( 12), MAXL        , MAXLM
C
C*                                                              **
C*****************************************************************
      COMMON/CIA/GOLOOT(12240)
      COMMON/CMS/ EION(20)
      EQUIVALENCE(ZBAR,EION(3))
      EQUIVALENCE (EION(5),PHI), (EION(16),ZMEAN)
      EQUIVALENCE  (EION(15), NSUBE)
      REAL LNGAMA
      REAL NSUBE
```

```
      COMMON/TATESA/EOSPAR(50)
      COMMON/LMSB/POTENL(5550)
      DIMENSION  H(3)
      EQUIVALENCE (POTENL(1),H(1) )
C                   LOAD ENTIRE POTENTIAL TABLE
      COMMON/LMSC/ M(51)
      DIMENSION Z(51),PART(51)
      EQUIVALENCE(M(1),NOLMNT), (M(2),Z(2)),(M(3),PART(3))
      COMMON/LMSD/          TLMS(30)
      EQUIVALENCE(TLMS(1),BACK1),(TLMS(2),BACK2),(TLMS(7),ZBARLN)
      EQUIVALENCE(DPDTAU,EION(12)),(DPDTHT,EION(13)),(NBAR,EION(17)),
     2   (TLMS(15),DZDTAU),(TLMS(16),DZDTHT)
      COMMON/LMSE/MATERL,ILEMNT,SNAFU,I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,J1,     0800
     2 J2,J3,J4,J5,J6,J7
      EQUIVALENCE (SNAFU,PATH)
      EQUIVALENCE (I10,M2)
      COMMON/LMSESN/TLMSB(15)
      COMMON/LMSG/CARBNZ(10)
      DIMENSION AIR(10)
      EQUIVALENCE (AIR(1),CARBNZ(1))
      COMMON/CNTRL/SCYCLE,JMULT
      COMMON/EOSIN/EIONIN(30)
      EQUIVALENCE (MARK,EIONIN(28))
      COMMON/GOLEMA/ THATA(250),RHA(250)
      DIMENSION ROW(1)
      DIMENSION  WORD(8)
      EQUIVALENCE (DELRHO, DELTAU)
      COMMON/LNES//ETA
      COMMON/LMSJ/MATREL(11,37)
      REAL MATREL
      DATA MARKER/1/,IPRNTD/0/,EION(1),SUMPTS,XNPTS,OLDWAY,OKLM(1)/5*0./
      DATA ALEX/1.E-4/
C
C
      WRITE(6,7000)
      WRITE(6,7001)
      WRITE(6,7002)
      WRITE(6,7003)
      WRITE(6,7004)
      WRITE(6,7005)
      WRITE(6,7006)
      WRITE(6,7007)
      WRITE(6,7008)
      WRITE(6,7009)
      WRITE(6,7010)
      WRITE(6,7011)
      WRITE(6,7012)
      WRITE(6,7013)
      MAXPOT = EOSPAR(2)
      WRITE(6,712)
      WRITE(6,7016) (POTENL(K), K=1,MAXPOT)
      WRITE (6,765)
      DO 7777 N=1,37
      N100=         N + 100
      WRITE (6,764) N100, (MATREL(L,N), L=1,11)
```

```
 7777 CONTINUE
C
C
       CALL TICKER ( TIME1)
C
C
C           COLUMNS           FORMAT          DATA
C
C             1-4              F4.0           OKLM(1)
C             5-8              F4.1           TRAIL
C              9               I1             IPRNTO
C                                             IF(IPRNTO .EQ. 0) PRINT
C                                             IF(IPRNTO .EQ. 1) NO PRINT
C                                             IF (IPRNTO .EQ. 2) PRINT GOLOUT
C                                             ARRAY ONLY (NO TITLES)
C                                             IF (IPRNTO .EQ. 3) PRINT GOLOUT
C                                             ARRAY WITH TITLES
C             10               I1             IPNCHO
C                                             IF(IPNCHO .EQ. 0) PUNCH
C                                             IF(IPNCHO .EQ. 1) NO PUNCH
C                                             IF(IPNCHO.EQ.2.OR.IPNCHO.EQ.3)
C                                             .AND.TRAIL.EQ.11.) PUNCH DIA-
C                                             PHANOUS INPUT IN STANDARD OUT-
C                                             PUT FORMAT
C                                             IF(IPNCHO.EQ.3.OR.IPNCHO.EQ.4)
C                                             .AND.TRAIL.EQ.11.)PUNCH RELEZ,
C                                             RELZBR, RELION, RELPRS, RELENG
C            11-20             F10.0          THETA(1)
C            21-35             E15.8          RHO(1)
C            36-50             E15.8          SV(1)
C            51-54             F4.0           TEST
C            55-66             E12.6          DELTHT
C            67-78             E12.6          DELTAU
C            79-80             I2             J
C
   10 CONTINUE
      OLM(18)=  0.
      READ(5,7061 OKLM(1),TRAIL,IPRNTO,IPNCHO,THETA(1),ROW(1),SV(1),
     2           TEST,DELTHT,DELTAU,J
      SUMPTS = SUMPTS + XNPTS
      MOTET=   0
      IF(OKLM(1).LE.251..OR. OKLM(1).GT.300.) GO TO 101
      MOTET=    1
      MOXTE1=   0
      CALL CONMAT(OKLM(1),MOXTE1)
  101 CONTINUE
      IF (OKLM(1) .EQ. 0.) GO TO 11
         IF(OLDWAY .EQ. 2. .OR. OLDWAY .EQ. 3. .OR. IPNCHO .EQ. 1)
     2       GO TO 1599
         IF (OKLM(1) .LT. 0.) GO TO 1599
         IF (IPRNTO.EQ.2 .OR. IPRNTO.EQ.3) GO TO 1599
      PUNCH 7700
      PUNCH 7701
      PUNCH 7702
      PUNCH 7703
```

```
      IF((IPNCHU.EQ.2.OR.IPNCHU.EQ.3).AND.TRAIL.EQ.11.) PUNCH 7704
      IF((IPNCHU.EQ.3.OR.IPNCHU.EQ.4).AND.TRAIL.EQ.11.) PUNCH 7707
      IF((EOSPAR(37).NE.0.).AND.(IPNCHU.NE.1)) PUNCH 7705
      IF((OKELM(1).EQ.6.).OR.(OKELM(1).EQ.306.)) PUNCH 7706
      IF(MOTET.EQ.1) PUNCH 7720
 1599 CONTINUE
      XNPTS = 0.
C
        IF(ABS(OKELM(1) + .4) .LT. ALEX) GO TO 10
        IF(ABS(OKELM(1) + .41) .LT. ALEX) GO TO 41
        IF(ABS(OKELM(1) + .43) .LT. ALEX) GO TO 43
        IF(ABS(OKELM(1) + .44) .LT. ALEX) GO TO 44
        IF(ABS(OKELM(1) + .45) .LT. ALEX) GO TO 45
        IF(ABS(OKELM(1) + .48) .LT. ALEX) GO TO 48
      GO TO 42
C   ************************************************************
C          THE FOLLOWING CARDS ARE ALL
C          READ WITH 10E8.3 FORMATS
C          (INCLUSIVE BOUNDRIES ARE
C          WORD N STARTS AT 8(N-1)+1
C          AND ENDS AT 8N )
   41 CONTINUE
      READ (5,751) (EOSPAR(K), K=1,10)
      GO TO 10
   43 CONTINUE
      READ (5,751) (EOSPAR(K), K=11,20)
      GO TO 10
   44 CONTINUE
      READ (5,751) (EOSPAR(K), K=21,30)
      GO TO 10
   45 CONTINUE
      READ (5,751) (EOSPAR(K), K=31,40)
      GO TO 10
   48 CONTINUE
      READ (5,751) (EOSPAR(K), K=41,50)
      GO TO 10
   42 CONTINUE
      IF(TEST .NE. 0.) GO TO 102
         IF (IPRNTO.NE.2 .AND. IPRNTO.NE.3) WRITE(6,7014) (EOSPAR(K),
     1      K=1,50)
C
      RIA = EOSPAR(1)
      ECHCK(18) = EOSPAR(5)
      DO 46 I=1,11
      EIONIN(I) = EOSPAR(I+5)
   46 CONTINUE
C     EOSPAR(17) CONTROLS FESTER, THE CMOL CALL SEQUENCE PARAMETER.
      EIONIN(28) = EOSPAR(17)
      EIONIN(29) = EOSPAR(18)
      EIONIN(30) = EOSPAR(19)
      M2 = EOSPAR(20)
      RPIA=       EOSPAR(21)
         IF(RPIA .EQ. 0.) WRITE(6,7015)
C     RPIA = 0  IF INCLUDE BLACK-BODY RADIATION CONTRIBUTION
C                IN SUBROUTINE EOS
```

```
      POSHA=      EOSPAR(22)
      MAXLM=      EOSPAR(23)+.5
      LMDA(2)=    EOSPAR(24)+.5
      SOLID(18)=  EOSPAR(25)
      SCYCLE=     EOSPAR(26)
      NR=         EOSPAR(27)+.5
      IAM1=       EOSPAR(28)+.5
      IB=         EOSPAR(29)+.5
      CVA=        EOSPAR(30)
      SOLID(17)=  EOSPAR(31)
      RIB=        EOSPAR(32)
      HVA=        EOSPAR(33)
      HCA=        EOSPAR(34)
      AMASNO(1)=  EOSPAR(35)
      CHRNO(1)= EOSPAR(38)
      OKLM(18)= EOSPAR(39)
      CMIN = EOSPAR(40)
      LMDA(1)   = EOSPAR(41) + .5
      MAXL = EOSPAR(42) + .5
      S2=            EOSPAR(43)
      MOXIE = OKLM(1)+.5
      IF (MOXIE .EQ. 102) MARK=EOSPAR(44)+.5
C     EOSPAR(44) CONTROLS MARK, THE AIRMOL CALL SEQUENCE PARAMETER.
C
C     SET EOSPAR(37) .NE. 0. TO CALL KAPPA
C     IF KAPPA IS TO BE CALLED, FIRST CALL EIONX TO GET PHI AND ZMEAN
      IF (EOSPAR(37) .EQ. 0.) GO TO 47
      CALL EIONX(1., 1., MOXY, -1.)
      AMASNO(1)=   PHI
      CHRNO(1)=    ZMEAN
C
      ZP1(1)=    CHRNO(1)**(-1.3333333)
      ZP2(1)=    CHRNO(1)**2.3333333
   47 CONTINUE
      WRITE ( 6, 712)
      TIMEA = 0.
      FEW(1)=   0.
      HSUBE=    0.
      EGAM3=    0.
      ZBAR = 0.
      TLMS(10)=  0.
      EIONIZ = 0.
      GAMMA=      0.
      LNGAMA = 0.
         IF (IPRNTD.NE.3 .AND. IPRNTD.NE.2) GO TO 4
      ASSIGN 4 TO LRN
      GO TO 5
    4 IPRNTO = IPRNTD
C     SET IPRNTD = IPRNTO TO AVOID IPRNTD WIPE-OUT BY LAST DATA CARD
C
C
      OLDWAY = TRAIL
      LTRAIL = TRAIL + 1.5
      GO TO (13,13,15,15,15,13,13,15,13,13,13,13,13,13,15,13), LTRAIL
   15 CONTINUE
```

```
      IF(ROW(I).EQ.0.)ROW(I)=1./SV(I)
      IF(SV(I).EQ.0.)SV(I)=1./ROW(I)
   13 CONTINUE
      WRITE(6,705) OKLM(1),TRAIL,IPRNTO,IPNCHO,J,THETA(1),ROW(1),SV(1)
C
C     ********  TRAIL OPTIONS  ******************************************
C     TRAIL = 0.   NORMAL GRID OF TEMPERATURE-DENSITY POINTS
C     TRAIL = 1.   SPECIAL ZMEAN PATH
C     TRAIL = 2.   PERFECT GAS AND READ ONE CARD PER POINT
C     TRAIL = 3.   READ ONE CARD PER POINT
C     TRAIL = 4.   COMPUTE (THETA, TAU) RECTANGLE AROUND CENTRAL POINT
C     TRAIL = 5.   NORMAL GRID OF SELECTED TEMPERATURE-DENSITY POINTS
C     TRAIL = 6.   MOLECULAR EQUATION OF STATE CHECKOUT SET
C     TRAIL = 7.   COMPUTE (THETA, RHO) RECTANGLE AROUND CENTRAL POINT
C     TRAIL = 8.   GRID OF TEMPERATURE-LOW DENSITY (.LE. .1) POINTS
C     TRAIL = 9.   GRID OF TEMPERATURE-HIGH DENSITY (.GE. .01) POINTS
C     TRAIL = 10.  GRID OF DENSITIES-LOW TEMPERATURE (.LE. 10 E.V.)
C     TRAIL = 11.  READ DIAPHANOUS DATA CARD
C     TRAIL = 12.  READ GILMORE DATA CARD (SEE TRAIL=11 PATH, COMMENTS)
C     TRAIL = 13.  READ HILSENRATH DATA CARD(SEE TRAIL=11 PATH,COMMENTS)
C     TRAIL = 14.  NORMAL TEMPERATURE SET AT ONE SELECTED DENSITY
C     TRAIL = 15.  NORMAL DENSITY SET AT ONE SELECTED TEMPERATURE
C
C     ******************************************************************
C
C
      IF(TRAIL .EQ. 2.) OKLM(1) = -OKLM(1)
      IF(TRAIL .EQ. 1.) GO TO 12
         IF (MOXIE .NE. 207) GO TO 6601
      READ (5,751) SOLID,OKLM(2)
      WRITE (6,729) SOLID
      WRITE (6,733) OKLM(2)
      PUNCH 7722
      OKLM(1) = OKLM(2)
 6601 CONTINUE
      IF(TRAIL .EQ. 0. .OR. TRAIL .EQ. 8. .OR. TRAIL .EQ. 9. .OR. TRAIL
     2   .EQ. 5. .OR. TRAIL .EQ. 10. .OR. TRAIL .EQ. 14.) GO TO 500
      IF(TRAIL.EQ.15.) GO TO 500
      IF(TRAIL .EQ. 4.) GO TO 200
      IF(TRAIL .EQ. 6.) GO TO 400
      IF(TRAIL .EQ. 7.) GO TO 600
         IF(TRAIL .GE. 11. .AND. TRAIL .LE. 13.) GO TO 100
C
C
C
    1 CONTINUE
      WRITE(6,718)
C     TRAIL = 2.   PERFECT GAS AND READ ONE CARD PER POINT
C     TRAIL = 3.   READ ONE CARD PER POINT
      ASSIGN 14 TO LREIN
      GO TO 6500.
   14 CONTINUE
      GO TO 10
C
   11 CONTINUE
```

```
C     NORMAL EXIT POINT
      IF(OLDWAY.EQ.1..OR.OLDWAY.EQ.2..OR.OLDWAY.EQ.3.) GO TO 17
      TIMEC = TIMEA/XNPTS
      TIMEB=         (TIME3 - TIME1) * 16.666667
      TIMED = TIMEB/SUMPTS
      ASSIGN 2 TO LRN
      IF (IPRNTD.NE.2 .AND. IPRNTD.NE.3) GO TO 2
    5 CONTINUE
      MARKER = 1
      WRITE(6,7014) (EOSPAR(K), K=1,50)
      WRITE (6,7020) MOXIE
        IF (MOXIE.LT.101 .OR. MOXIE.GT.200) GO TO 7776
      ICD1=          MOXIE - 100
      ICD2 =         2 * IFIX(MATREL(1,ICD1) + .5) + 1
      WRITE (6,7023) (MATREL(ICD,ICD1),ICD=2,ICD2)
 7776 CONTINUE
      WRITE (6,7024) ZMEAN, PHI, TLMS(3), ECHCK(18)
      DO 3 J = 1,11628,612
      L = J + 611
      IF (IPRNTD .EQ. 2) GO TO 6
      WRITE (6,7021) (GOLOUT(I),I=J,L)
      GO TO 7
    6 WRITE (6,7022) (GOLOUT(I),I=J,L)
    7 CONTINUE
        IF (GOLOUT(L+1) .EQ. 0.) GO TO 21
    3 CONTINUE
   21 CONTINUE
      WRITE (6,712)
      GO TO LRN,(2,4)
    2 CONTINUE
C
C     TIMEA = (TIME3 - TIME2) * 16.666667,SUM OF TIMES USED DURING CALLS
C       TO EOS.
C     TIMEB = (TIME3 - TIME1) * 16.666667, TOTAL TIME (IN MILLISECONDS)
C       BETWEEN START OF RUN AND LAST CALL TO EOS FOR THE LAST INPUT
C       CARD.
C     TIMEC = TIMEA/XNPTS, WHERE XNPTS IS THE TOTAL NUMBER OF THETA-RHO
C       POINTS FROM THE LAST INPUT CARD.
C     TIMED = TIMEB/SUMPTS, WHERE SUMPTS IS THE TOTAL NUMBER OF POINTS
C       IN THE ENTIRE GOLEM RUN.
C     ALL TIMES PRINTED ARE IN MILLISECONDS
C
      WRITE (6,7025)
      WRITE (6,7026) TIME1, TIMEA, TIME2, TIMEB, TIME3, TIMEC, XNPTS,
     1               TIMED, SUMPTS
C
   17 CONTINUE
      CALL EXIT
      RETURN
C
C
   12 CONTINUE
C     TRAIL = 1.   SPECIAL ZMEAN PATH
      WRITE(6,720)
      IDIOT=    OKLM(1) + .5
```

```
      CALL EIONX (1.,1.,ID10),-1.)
      WRITE(6,701) OKLM(1),ZMEAN,PHI,TLMS(3)
      GO TO 10
C
   16 CONTINUE
      WRITE(6,753)
      CALL EXIT
      RETURN
C
  100 CONTINUE
C
C     TRAIL = 11.  READ DIAPHANOUS DATA CARD
C     DIAPHANOUS DATA IS
C     WORD(1) = THETA OR RHO                WORD(2) = PRESSURE
C     WORD(3) = ENERGY                      WORD(4) = EION
C     EION IS THE DIAPHANOUS NAME FOR EIONIZ
C     WORD(5) = KROS                        WORD(6) = KPLK
C     WORD(7) = ZBAR                        WORD(8) = EGAM
C     TRAIL = 12.  READ GILMORE DATA CARD (SEE TRAIL=11 PATH, COMMENTS)
C     GILMORE DATA HAS WORD(1), AND WORD(3) AS IN DIAPHANOUS, AND
C              WORD(2) = P (DYNES/CM2) AND WORDS(4) THRU (8)
C              ARE NOT USED.
C     TRAIL = 13.  READ HILSENRATH DATA CARD(SEE TRAIL=11 PATH,COMMENTS)
C     HILSENRATH DATA HAS WORD(1) = T (DEG. KELVIN) OR
C        LOG(RHO/REFERENCE-RHO). (WHERE REFERENCE-RHO IS WORD(2)
C        ON CARD WITH T IN WORD(1))
C     WORD(2) = REFERENCE RHO (G/CC) OR P (ATMOSPHERES)
C     WORD(3) = E/RT
C     WORDS (4), (5), AND (6) ARE NOT USED
C     WORD(7) = 1.991 * (1.+ZBAR)
C     WORD(8) IS NOT USED
C
      READ(5,730) (HEAD(I), I=1,12)
      WRITE(6,732) (HEAD(I), I=1,12)
      RELPRS = 0.
      RELENG = 0.
      RELE2  = 0.
      RELZBR = 0.
      RELION = 0.
  102 READ(5,734) (WORD(I), I=1,8)
      IF(WORD(3) .NE. 0.) GO TO 104
C        IF WORD(1) .EQ. -.4, END INPUT AND GO TO NEXT TRAIL CARD.
C     TO END DIAPHANOUS SET, USE CARD PUNCHED WITH -.40 IN COLUMNS 1-4.
C     IF A BLANK CARD FOLLOWS DIAPHANOUS CARD, PROGRAM GOES INTO EXIT
        IF (ABS(WORD(1) + .4) .LT. ALEX) GO TO 103
         IF(WORD(1) .EQ. 0.) GO TO 11
         IF(THETA(1) .NE. WORD(1)) WRITE(6,712)
         IF(TRAIL .LE. 12.) THETA(1) = WORD(1)
         IF(TRAIL .EQ. 13.) THETA(1) = WORD(1)/1.16054E4
         IF(TRAIL .EQ. 13.) REFRHO = WORD(2)
      GO TO 102
  103 TIMEC = TIMEA/XNPTS
      WRITE (6,700) TIMEC, TIMEA, XNPTS
C     TIMEC UNITS ARE MILLISECONDS PER COMPUTATIONAL POINT.
      GO TO 10
```

```
  104 CONTINUE
         IF(TRAIL .LE. 12.( ROW(1) = WORD(1)
         IF(TRAIL .EQ. 13.) ROW(1) = EXP(WORD(1)*2.3025851) * REFRHO
      SV(1)=     1./ROW(1)
      IF((ORLM(1) .EQ. 6. .OR. ORLM(1) .EQ. 306.) .AND. ROW(1( .GT. 10.
     1 .AND. RIA .NE. 0.) GO TO 102
         IF(TRAIL .EQ. 13.) WORD(2) = WORD(2)*1.01325
         IF(TRAIL .NE. 13.( GO TO 108
      WORD(7( = WORD(7)/1.991 - 1.0
      WORD(3) = WORD(3) * THETA(1) * 3.3312097E10
  108 CONTINUE
         IF(TRAIL .NE. 12.) WORD(2) = WORD(2) * 1.E6
         IF(TRAIL .EQ. 11.) WRITE(6,735)
         IF(TRAIL .EQ. 12.( WRITE(6,736(
         IF(TRAIL .EQ. 13.( WRITE(6,737)
      WRITE(6,738( THETA(1(, ROW(1), (WORD(I), I=2,8)
      WRITE(6,739(
      ASSIGN 115 TO LRETN
      GO TO 6500
  115 CONTINUE
         IF(EIONIZ .NE. 0.) RELION = 1.E2 * (WORD(4(-EIONIZ)/WORD(4)
      RELPRS = (WORD(2)-P1(1))/WORD(2(*1.E2
      RELENG = (WORD(3(-E(1()/WORD(3)*1.E2
      RELE2 = (WORD(3(-E(1)+ECHCK(18)(/WORD(3) * 1.E2
         IF(WORD(7).NE.0.(RELZBR = (WORD(7)-FEW(1))/WORD(7)*1.E2
      WRITE(6,740) RELPRS, RELENG, RELZBR,RELE2,RELION
      GAMMA = 0.
      LNGAMA = 0.
      GO TO 102
C
  200 CONTINUE
C     TRAIL = 4.   COMPUTE (THETA, TAU( RECTANGLE AROUND CENTRAL POINT
      WRITE(6,722)
      WRITE(6,716( DELTHT,DELTAU
      SAVTAU = SV(1(
      SAVTHT = THETA(1)
      THETA(1) = SAVTHT - 5.0 * DELTHT
      TIMEA = 0.
      DO 220 N1=1,11
      SV(1( = SAVTAU - 5.0 * DELTAU
         IF (IPRNTO.NE.2 .AND. IPRNTO.NE.3) WRITE(6,712)
      DO 210 N2=1,11
      ROW(1) = 1./SV(1)
      ASSIGN 205 TO LRETN
      GO TO 6500
  205 CONTINUE
      SV(1( = SV(1) + DELTAU
  210 CONTINUE
      THETA(1( = THETA(1) + DELTHT
  220 CONTINUE
      TIMEC = TIMEA/XNPTS
      WRITE (6,700) TIMEC, TIMEA, XNPTS
      GO TO 10
C
  400 CONTINUE
```

```
C      TRAIL = 6.  MOLECULAR EQUATION OF STATE CHECKOUT SET
       WRITE(6,724)
       TIMEA = 0.
       DO 420 I=1,60
       FI=        I
       THETA(1)=  FI*5.E2/1.16054E4
          IF (IPRNTO.NE.2 .AND. IPRNTO.NE.3) WRITE(6,712)
       DO 420 J=1,12
       JJ=         11-J
       SV(1)=      10.**JJ
       ROW(1)=     1./SV(1)
       ASSIGN 410 TO LRETN
       GO TO 6500
  410  CONTINUE
  420  CONTINUE
       TIMEC = TIMEA/XNPTS
       WRITE (6,700) TIMEC, TIMEA, XNPTS
       GO TO 10
C
  500  CONTINUE
C      TRAIL = 0.   NORMAL GRID OF TEMPERATURE-DENSITY POINTS
C      TRAIL = 5.   NORMAL GRID OF SELECTED TEMPERATURE-DENSITY POINTS
C      TRAIL = 8.   GRID OF TEMPERATURE-LOW DENSITY (.LE. .1) POINTS
C      TRAIL = 9.   GRID OF TEMPERATURE-HIGH DENSITY (.GE. .01) POINTS
C      TRAIL = 10.  GRID OF DENSITIES-LOW TEMPERATURE (.LE. 10 E.V.)
C      TRAIL = 14.  NORMAL TEMPERATURE SET AT ONE SELECTED DENSITY
C      TRAIL = 15.  NORMAL DENSITY SET AT ONE SELECTED TEMPERATURE
       IF(TRAIL .EQ. 0.) WRITE(6,726)
          IF(TRAIL .EQ. 5.) GO TO 502
       IF(TRAIL .EQ. 8.) WRITE(6,708)
       IF(TRAIL .EQ. 9.) WRITE(6,709)
       IF(TRAIL .EQ. 10.) WRITE(6,710)
       IF(TRAIL .EQ. 14.) WRITE(6,719)
       IF(TRAIL.EQ.15.) WRITE(6,725)
       GO TO 504
  502  CONTINUE
       WRITE(6,746) THETA(1),DELTHT,ROW(1),DELTAU
       THETLO = THETA(1)
       THETHI = DELTHT
       RHOLO = ROW(1)
       RHOHI = DELTAU
  504  CONTINUE
       WRITE(6,742) THATA
       WRITE(6,707)
       WRITE(6,744) RHA
       TIMEA = 0.
       WRITE (6,712)
       DO 530 I=1,250
       IF(THATA(I) .EQ. 0.) GO TO 540
          IF(TRAIL .EQ. 5. .AND.(THATA(I) .GT. THETHI .OR. THATA(I) .LT.
     2    THETLO)) GO TO 530
       IF(TRAIL .EQ. 10. .AND. THATA(I) .GT. 10.) GO TO 540
       IF(TRAIL.NE.15.) THETA(1)= THATA(I)
          IF ((TRAIL.NE.14.) .AND. (IPRNTO.NE.3) .AND. (IPRNTO.NE.2))
     1       WRITE (6,712)
```

```
      IF(MOTET.EQ.1)  WRITE(6,760)
      IF(MOTET.EQ.1.AND.RPIA.NE.0.) WRITE(6,763)
      DO 520 J=1,250
      IF(RHA(J) .EQ. 0.0) GO TO 525
         IF(TRAIL .EQ. 5. .AND.(RHA(J) .GT. RHOHI .OR. RHA(J) .LT.
     2   RHOLO)) GO TO 520
      IF(TRAIL .EQ. 8. .AND. RHA(J) .GT. 1.E-1) GO TO 520
      IF(TRAIL .EQ. 9. .AND. RHA(J) .LT. 1.E-2) GO TO 530
      IF(TRAIL .NE. 14.) ROW(1) = RHA(J)
      SV(1) = 1./ROW(1)
      ASSIGN 510 TO LRETN
      GO TO 6500
  510 CONTINUE
      IF(TRAIL.EQ.14.) GO TO  530
  520 CONTINUE
  525 CONTINUE
      IF(TRAIL.EQ.15.) GO TO 540
  530 CONTINUE
  540 CONTINUE
      TIMEC = TIMEA/XNPTS
      WRITE (6,700) TIMEC, TIMEA, XNPTS
      GO TO 10
C
  600 CONTINUE
C     TRAIL = 7     COMPUTE (THETA, RHO) RECTANGLE AROUND CENTRAL POINT
      WRITE(6,722)
      WRITE(6,717) DELTHT,DELRHO
      SAVRHO = ROW(1)
      SAVTHT = THETA(1)
      THETA(1) = SAVTHT - 5.0 * DELTHT
      TIMEA = 0.
      DO 620 N1=1,11
      ROW(1) = SAVRHO/(DELRHO**5)
         IF (IPRNTO.NE.2 .AND. IPRNTO.NE.3) WRITE(6,712)
      DO 610 N2=1,11
      SV(1) = 1./ROW(1)
      ASSIGN 605 TO LRETN
      GO TO 6500
  605 CONTINUE
      ROW(1) = ROW(1) * DELRHO
  610 CONTINUE
      THETA(1) = THETA(1) + DELTHT
  620 CONTINUE
      TIMEC = TIMEA/XNPTS
      WRITE (6,700) TIMEC, TIMEA, XNPTS
      GO TO 10
C
C     *****  WRITE AND PUNCH STATEMENTS  *****
 6500 CONTINUE
 6602 CONTINUE
      IF(MOTET.EQ.1) GO TO 300
      IF((OKLM(1) .EQ. 6. .OR. OKLM(1) .EQ. 306.) .AND. ROW(1) .GT. 10.
     1 .AND. RIA .NE. 0.) GO TO 6550
      GAMMA = 0.
      LNGAMA = 0.
```

```
      EMOL= 0.
      EIONIZ = 0.
      XNPTS = XNPTS + 1.
C
C     SET EOSPAR(36) .EQ. 0. TO CALL EOS
        IF (EOSPAR(36) .NE. 0.) GO TO 6503
      CALL TICKER(TIME2)
C
      CALL EOS(1)
      CALL TICKER(TIME3)
      TIMEA=       (TIME3 - TIME2) * 16.666667 + TIMEA
      IF (MOXIE.EQ.207) GO TO 6600
      EGAM = 1. + P1(1)*SV(1)/(E(1)-ECHCK(18))
      EGAM2 = 1. + P1(1)*SV(1)/E(1)
      IF(EION(1).NE.0.) EGAM3= 1.+EION(7)*EION(2)/(1.5*TEMS(9)*EION(1))
        IF (IPRNTO.EQ.2 .OR. IPRNTO.EQ.3) GO TO 6503
      WRITE(6,703) THETA(1), ROW(1), SV(1), P1(1), E(1), CV(1), PBI(1),
     1            FEW(1), ASQ(1)
 6503 CONTINUE
C       SET EOSPAR(36).EQ.0. TO CALL EOS
C       SET EOSPAR(37).EQ.0. TO AVOID KAPPA
      IF(EOSPAR(37).NE.0.) GO TO 6502
 6501 CONTINUE
      IF(OKEM(1) .GE. 201. .AND. OKEM(1) .LE. 300.) GO TO 6530
        IF(ZBAR .EQ. 0.) GO TO 6515
      EIONIZ = EION(8)-1.5*EION(1)*TLMS(9) +ECHCK(18)
CALCULATION OF TLMS(10) REMOVED BECAUSE EIONX APPROXIMATION IS GOOD. L.N.
      LNGAMA=    TEMS(10)/THETA(1)
      IF(LNGAMA .GT. 88.028) GAMMA = 1.E38
      IF(LNGAMA .LT. (-89.415987)) GAMMA = 1.E-38
      IF(GAMMA .EQ. 0.) GAMMA = EXP(LNGAMA)
        IF((GAMMA.ET.2.7182818) .AND. (IPRNTO.NE.2 .AND. IPRNTO.NE.3))
     1  WRITE (6,715)
      NSUBE=     (6.0247E23/TLMS(3))*ZBAR*ROW(1)
      GO TO 6520
 6515 CONTINUE
        IF (IPRNTO.NE.2 .AND. IPRNTO.NE.3) WRITE (6,728)
 6520 IF(IPRNTO .EQ. 1) GO TO 6530
        IF (IPRNTO.EQ.2 .OR. IPRNTO.EQ.3) GO TO 6504
      THCNST=    EION(10)-EION(1)*EION(13)+EION(7)
      RELCNS=    THCNST/EION(10)
      KK= 10*NOEMNT - 6
      KKK= 10*NOEMNT + 1
      WRITE(6,701)(EION(K),K=1,20),(TLMS(K),K=1,30),SNAFU,GAMMA,LNGAMA,
     2           NSUBE,THCNST,RELCNS
      WRITE(6,701) (Z(K),K=2,KKK)
      IF(MOXIE.EQ.101 ) WRITE(6,701)(TLMSB(K),K=1,15)
      IF (MOXIE .EQ. 6 .OR. MOXIE .EQ. 306 .OR. MOXIE .EQ. 102)
     1 WRITE (6,701) (CARBNZ(K),K=1,10)
      WRITE(6,702)I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,M(1),(M(K),K=4,KK,10),
     2MATERE,IEEMNT,J1,J2,J3,J4,J5,J6,J7
C           EQUIVALENCE(J2,L0)
      IF(NOEMNT.EQ.1) WRITE(6,701) POTENL(I1),POTENL(I3-1),POTENL(I3)
 6530 CONTINUE
        IF (IPRNTO.EQ.2 .OR. IPRNTO.EQ.3) GO TO 6504
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      IF(IPRNTO .EQ. 1) WRITE(6,752) SNAFU,GAMMA,LNGAMA,PHI,TLMS(10)
     1   ,NSUBE, THCNST, RELCNS, DPDTAU, EION(14)
      WRITE(6,7018) EGAM, EGAM2, EGAM3, EIONIZ
         IF(IPNCHO .EQ. 1) GO TO 6540
      IF((IPNCHO.EQ.2.OR.IPNCHO.EQ.3).AND.TRAIL.EQ.11.) PUNCH 721,MOXIE,
     1THETA(1),ROW(1),(WORD(K),K=2,8)
      IF((IPNCHO.EQ.3.OR.IPNCHO.EQ.4).AND.TRAIL.EQ.11.) PUNCH 727,MOXIE,
     1THETA(1),ROW(1),RELPRS,RELENG,RELE2,RELZBR,RELION
      PUNCH 704,  MOXIE ,THETA(1),ROW(1),P1(1),E(1),CV(1),PB1(1),FEW(1),
     2            ASQ(1)
      IF((OKLM(1).GE.201.).AND.(OKLM(1).LE.300.)) GO TO 6509
      PUNCH 711, MOXIE, THETA(1), ROW(1), P1(1), E(1), GAMMA, TLMS(10),
     2            FEW(1), EIONIZ
      PUNCH 713, MOXIE,THETA(1),ROW(1),DPDTAU,DPDTHT,DZDTAU,DZDTHT,NBAR,
     1            NSUBE
 6509 CONTINUE
      PUNCH 714, MOXIE, THETA(1), ROW(1), P1(1), E(1), EGAM, EGAM2,
     1            FEW(1), ECHCK(18)
      IF((OKLM(1).EQ.6.).OR.(OKLM(1).EQ.306.).AND.(RIA.NE.0.))
     1              GO TO 6510
 6511 CONTINUE
 6550 CONTINUE
 6540 IF((TRAIL .LE. 10.) .OR. (TRAIL .GE. 14.)) WRITE(6,707)
 6541 CONTINUE
      GO TO LRETN,(14,115,510,205,410,605)
 6502 CONTINUE
      CALL KAPPA(1,1)
         IF (IPRNTO.EQ.2 .OR. IPRNTO.EQ.3) GO TO 6505
      WRITE(6,7100) THETA(1),ROW(1),SV(1),OKLM(1),CAPAR(1),CAPAC(1),
     2FEW(1)
      IF(IPNCHO .NE. 1) PUNCH 7101, MOXIE, THETA(1), ROW(1), FEW(1),
     2 CAPAR(1), CAPAC(1)
 6505 CONTINUE
         IF ((EOSPAR(56).NE.0.) .AND. (IPRNTO.EQ.2 .OR. IPRNTO.EQ.3)) GO
     1      TO 6504
         IF(EOSPAR(56).NE.0.) GO TO 6550
      GO TO 6501
 6504 CONTINUE
      GOLOUT(MARKER) = THETA(1)
      GOLOUT(MARKER + 1) = ROW(1)
      GOLOUT(MARKER + 2) = P1(1)
      GOLOUT(MARKER + 3) = E(1)
         IF (EOSPAR(57) .EQ. 0.) GO TO 6512
      GOLOUT(MARKER + 4) = CAPAR(1)
      GOLOUT(MARKER + 5) = CAPAC(1)
 6513 CONTINUE
      GOLOUT(MARKER + 6) = FEW(1)
      GOLOUT(MARKER + 7) = CV(1)
      GOLOUT(MARKER + 8) = PB1(1)
      GOLOUT(MARKER + 9) = ASQ(1)
      GOLOUT(MARKER + 10) = EGAM
      GOLOUT(MARKER + 11) = EGAM2
         IF (EGAM .EQ. EGAM2) GOLOUT(MARKER+11) = GAMMA
      MARKER = MARKER+12
      GO TO 6541
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 6512 CONTINUE
      GOLOUT(MARKER+4) = EION12
        IF (EOSPAR(1).NE.0. .AND. EION(17).NE.1.) GOLOUT(MARKER+4) =
     1                                                   EION(17)
C     EION(17) = NBAR
      GOLOUT(MARKER+5) = TLMS(10)
      GO TO 6513
 6510 CONTINUE
      ISAVMX=   MOXIE
      MOXIE= 6
      EMOL=  CARBNZ(1) +ECHCK(18)
      PUNCH 725, MOXIE,THETA(1),ROW(1),EMOL,P1(1),(CARBNZ(K),K=3,6),
     2   NBAR,ECHCK(18)
      MOXIE=   ISAVMX
      GO TO 6511
 6600 CONTINUE
      CALL ES7
      REL P1 = (EION(7)-P1(1))/EION(7)
      REL P2 = (EION(7)-P1(1))/P1(1)
      WRITE (6,7019) THETA(1),ROW(1),ETA,P1(1),EION(7),REL P1, REL P2
      WRITE (6,701) EION
      WRITE (6,701) E(1),CV(1)
      PUNCH 731, MOXIE,THETA(1),ROW(1),P1(1),EION(7),REL P1,REL P2,E(1),
     1          EION(3)
      GO TO 6541
  300 CONTINUE
      CALL DVCHK(IFAKE)
      CALL TICKER(TIME2)
      THUTA=    THETA(1)*1.E-3
      CALL EOSMOT(MOXIE1,1,SV(1),THUTA    ,ANS)
      P1(1)=    ANS*1.E16
      CALL EOSMOT(MOXIE1,2,SV(1),THUTA    ,ANS)
      E(1)=     ANS*1.E16
      CALL EOSMOT(MOXIE1,3,SV(1),THUTA    ,ANS)
      CV(1)=    ANS*1.E13
      CALL EOSMOT(MOXIE1,4,SV(1),THUTA    ,ANS)
      PB1(1)=   ANS*1.E16
      THUTA=    THUTA**4
      CALL EOSMOT(MOXIE1,5,SV(1),THUTA    ,ANS)
      XLMDA=    ANS
      CAPAR(1)= 1.37*SV(1)/ANS
      CALL TICKER(TIME3)
      SAVEP=    P1(1)
      SAVEE=    E(1)
      SAVECV=   CV(1)
      SAVEPB=   PB1(1)
      TIMEA=        (TIME3 - TIME2) * 16.666667 + TIMEA
      IF(RPIA.EQ.0.) GO TO 105
      THETA4=   THETA(1)**4
      P1(1)=    P1(1) -45.667*THETA4
      PB1(1)=   PB1(1) -137.0*THETA4
      E(1)=     E(1) -137.0*THETA4*SV(1)
      CV(1)=    CV(1) -548.0*THETA4/THETA(1)*SV(1)
  105 CONTINUE
      WRITE(6,761) MOXIE,THETA(1),ROW(1),P1(1),E(1),CV(1),PB1(1),CAPAR(1
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     1),XLMDA
      IF(RPIA.NE.0.) WRITE(6,762) SAVEP,SAVEE,SAVECV,SAVEPR
      IF(IPNCHO.NE.1) PUNCH 721,MOXIE,THETA(1),ROW(1),P1(1),E(1),
     1  CV(1),PU1(1),CAPAR(1),XLMDA
      GO TO LRETN,(14,115,510,205,410,605)
C
C     ****************** F O R M A T S **********************
C
C
C   ************************ READ FORMATS ************************
C
  706 FORMAT(F4.0, F4.1, 2I1, F10.0, 1P2E15.8, 0PF4.0, 1P2E12.6, I2)
  730 FORMAT(12A6)
  734 FORMAT(6E10.4, 2F6.3)
  751 FORMAT(10E8.3)
C
C   ************************ WRITE FORMATS ************************
C
  700 FORMAT (10H1 TIMEC = ,E13.6, 3X, 13H= TIMEA/XNPTS /10H  TIMEA = ,
     1E13.6,3X, 51H= SUM OF TIMES USED DURING CALLS TO EOS (OR EOSMOT) /
     210H  XNPTS = ,E13.6,3X,60H= TOTAL NUMBER OF THETA-RHO POINTS FROM
     3THE LAST INPUT CARD. /40H0 ALL TIMES PRINTED ARE IN MILLISECONDS.)
  701 FORMAT (1H , 1P10E13.6)
  702 FORMAT (1H , 10(1X,I10) )
  703 FORMAT (1H0  , 3X  1P9E14.7)
  705 FORMAT(10H0OKLM(1) = F6.1, 3X 7HTRAIL = F5.1, 3X 8HIPRNTO = I2, 3X
     2 8HIPNCHO = I2, 3X 3HJ = I2 //1X 10HTHETA(1) = 1PE15.8, 5H E.V. 3X
     3 8HRHO(1) = E15.8, 8H G./C.C. 3X 7HSV(1) = E15.8, 8H C.C./G.)
  707 FORMAT(//)
  708 FORMAT(67H0 GRID OF NORMAL TEMPERATURE-LOW DENSITY POINTS (FROM .1
     2 G/CC DOWN)/)
  709 FORMAT(67H0 GRID OF NORMAL TEMPERATURE-HIGH DENSITY POINTS (FROM .
     201 G/CC UP)/)
  710 FORMAT(58H0 GRID OF NORMAL DENSITIES-LOW TEMPERATURE (BELOW 10 E.V
     2.)/)
  712 FORMAT ( 1H1)
  715 FORMAT(53H0 ***** NOTE THAT GAMMA WAS LESS THAN 2.7182818 *****/)
  716 FORMAT(15H0 DELTA THETA = 1PE12.5, 4H  EV 5X 12H DELTA TAU =E12.5,
     1        6H  CC/G)
  717 FORMAT(15H0 DELTA THETA = 1PE12.5, 4H  EV 5X 12H DELTA RHO =E12.5,
     1        6H  G/CC)
  718 FORMAT(86H0 READ ONE CARD PER TEMPERATURE-DENSITY POINT.  PERFECT
     1GAS IF TRAIL (INPUT) EQUALS 2./)
  719 FORMAT(48H0 NORMAL TEMPERATURE SET AT ONE SELECTED DENSITY /)
  720 FORMAT(20H0 SPECIAL ZMEAN PATH///)
  722 FORMAT(40H0 COMPUTE RECTANGLE AROUND CENTRAL POINT///)
  724 FORMAT(38H0 MOLECULAR EQUATION OF STATE CHECKOUT///)
  725 FORMAT(49H0 NORMAL DENSITY SET AT ONE SELECTED TEMPERATURE /)
  726 FORMAT(43H0 NORMAL GRID OF TEMPERATURE-DENSITY POINTS/)
  728 FORMAT(45H0 PERFECT GAS ANSWER.  GAMMA WAS NOT COMPUTED/)
  729 FORMAT (19H1THE SOLID ARRAY IS /(5X,1P10E12.5))
  732 FORMAT(1H0 12A6)
  733 FORMAT (9H OKLM(2)=,F8.1)
  735 FORMAT(28H0 DIAPHANOUS TYPE CARDS HAVE )
  736 FORMAT(25H0 GILMORE TYPE CARDS HAVE )
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737 FORMAT(28H0 HILSENRATH TYPE CARDS HAVE )
738 FORMAT(                                5X 7HTHETA = 1PE12.5, 5H E.V. 3X
   25HRHO = E12.5, 5H G/CC 3X 3HP = E12.5, 10H DYNES/CM2 3X 3HE =
   3E12.5, 7H ERGS/G /5X 6HEION = E12.5, 7H ERGS/G 3X 6HKROS = E12.5,
   46H CM2/G 3X 6HKPLK = E12.5, 6H CM2/G 3X 6HZBAR = 0PF7.3, 3X
   56HEGAM = F7.3/)
739 FORMAT(15H0 EOS OUTPUT IS )
740 FORMAT(9H  REL P = 1PE12.5, 3X 7HREL E = E12.5, 3X 9HRELZBAR =
   2E12.5, 3X 15HREL (E-EZERO) = E12.5, 3X 13HREL IONIC E = E12.5//)
742 FORMAT(14H0 THETA SET IS/(1P10E12.5))
744 FORMAT(12H0 RHO SET IS/(1P10E12.5))
746 FORMAT(54H0 NORMAL GRID WITH SELECTED TEMPERATURE-DENSITY POINTS/
   21X,17H MINIMUM THETA = ,F9.3,6H E.V. ,17H MAXIMUM THETA = ,1PE12.5
   3,6H E.V. ,/1X,19H MINIMUM DENSITY = ,1PE10.4,5H G/CC,19H MAXIMUM D
   4ENSITY = ,E12.5,5H G/CC)
752 FORMAT(5X 7HSNAFU = 1PE10.3, 4X 7HGAMMA = E12.5, 4X 8HLNGAMA =
   2 E12.5,4X,5HPHI = E12.5,4X, 23HTLMS(10)=THETA*LNGAMA = E12.5
   3   /5X, 8HNSUBE = ,E12.5,10H THCNST = ,E12.5,10H RELCNS = ,E12.5,
   4    10H DPDTAU = ,E12.5,12H EION(14) = ,E12.5)
753 FORMAT(67H1 J MUST BE SPECIFIED ON TRAIL CARD SINCE RHCR= EOSPAR(J
   2) FOR AIR. 46H USE J=3 TO AVOID ESB WHEN MATERIAL NO. =102. /51H
   3USE J=4 TO AVOID EIONX WHEN MATERIAL NO. IS 208. )
760 FORMAT(1H0,5HOKLM ,5X,6HTHETA ,10X,4HRHO ,7X, 9HPRESSURE ,5X,7HENE
   2RGY ,7X,7HDEDTHT ,7X,7HDEDTAU ,8X,6HCAPAR ,7X,7HLAMBDA )
761 FORMAT(1H0,14,8(2X,1PE12.5))
762 FORMAT(1H0,40X,4(2X,1PE12.5))
763 FORMAT (73H THE SHORT LINE IS P, E, DEDTHT, DEDTAU, WITH RADIATION
   1 CONTRIBUTIONS.    /)
764 FORMAT (5X,  14,7X,F3.0,2X,5(F5.0,2X,F9.8))
765 FORMAT (16H1MATREL ARRAY IS //99H MATERIAL NO.  NOLMNT  Z       PA
   1RT      Z       PART      Z       PART      Z       PART      Z       PART
   2 )
7000 FORMAT(1H1  45X 32H**** STANDARD OUTPUT FORMAT **** //15H  OUTPUT
   2LINE 1)
7001 FORMAT(                                                   116H  THETA
   1(EV), RHO (G/CC), SV (CC/G), PI (DYNES/CM SQ), E (ERGS/G), CV (ERG
   2S/G/EV), PBI (ERGS/CC), FEW, ASQ (CM/SEC) /)
7002 FORMAT(21H0 EION ARRAY CONTAINS/ 19H  OUTPUT LINES 2, 3)
7003 FORMAT(                                    126H  THETA (EV), TAU (CC/G), ZBA
   1R, ZBAR1, PHI, ESUM, PRESHR (DYNES/CM SQ), ENERGY (ERGS/G), DEDTHT
   2 (ERGS/GM/EV), DEDTAU (ERGS/CC) / 122H  SNDSPD (CM/SEC), DPDTAU (E
   3RG-G/CC SQ), DPDTHT (DYNES/CM SQ/EV), FAILURE RECORD, NSUBE,  ZMEA
   4N, NBAR, ZSUM1, ZSUM2, ZSUM3/)
7004 FORMAT(31H  EXPLANATION OF SYMBOLS ABOVE )
7005 FORMAT(18H  1)  TAU =        , 22HSPECIFIC VOLUME (CC/G) /18H  2)
   1ZBAR =       , 48HMEAN ION CHARGE (NO. OF ELECTRONS / NO. OF IONS)/
   218H  3)  PHI =          , 32H9.648679E11 / MEAN ATOMIC WEIGHT /
   372H  4)  ALL DERIVATIVES W.R.T. TAU (DEDTAU, DPDTAU) ARE AT CONSTA
   4NT THETA. / 72H  5)  ALL DERIVATIVES W.R.T. THETA (DEDTHT, DPDTHT)
   5 ARE AT CONSTANT TAU. / 18H  6)  SNDSPEED =  , 57H((PARTIAL PRESHR
   6)/(PARTIAL DENSITY)) AT CONSTANT ENTROPY. / 71H  7)  FAILURE RECOR
   7D CONTAINS THE ERROR FLAG AFTER CATASTROPHIC ERRORS. )
7006 FORMAT(18H  9)  NBAR        , 102HMEAN NO. OF ATOMS PER MOLECULE.
   1 IT DIFFERS FROM UNITY IF MOLECULAR EQUATIONS-OF-STATE SO COMPUTE
   2IT. /)
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7007 FORMAT(21H0 TLMS ARRAY CONTAINS/ 25H  OUTPUT LINES 4, 5, 6, 7 )
7008 FORMAT(                                 126H  BACK1, BACK2, MEAN ATOMIC W
    1EIGHT, 4 VARIES, LN(GAMMA*ZBAR), XBAR(1), ZBARLN, SIGMA, XI, SYNTH
    2ETIC POTENTIAL (1=THETA*LNGAMA) / 107H  ZBAR + BACK2 - 2*BACK1, ZB
    3AR - BACK1, V(1,J) - V(1,J-1), SUMPOT, DZDTAU, DZDTHT, THE NEXT 14
    4 VALUES VARY /41H  SNAFU,GAMMA,LNGAMA,NSUBE,THCNST,RELCNS /)
7009 FORMAT(31H  EXPLANATION OF SYMBOLS ABOVE )
7010 FORMAT(36H  1)  BACK1 IS PREVIOUS ZBAR ITERATE / 43H  2)  BACK2 IS
    1 SECOND PREVIOUS ZBAR ITERATE / 39H  3)  XBAR(1) IS RELEVANT MOLE
    2FRACTION / 40H  4)  SIGMA (USED IN EIONMS) IS VARIABLE /10H  5)  X
    3I = 8X 22HPHI + (1./NBAR + ZBAR) / 65H  6)  V(I,J) IS THE JTH IONI
    4ZATION POTENTIAL (1 .LE. J .LE. Z(I)) / 20X 35HFOR THE ITH ELEMENT
    5 OF THE MATERIAL / 79H  7)  SUMPOT (USED IN EIONMS) SUMS THE FIRST
    6 (J-1) POTENTIALS WHERE 1 .LE. V(J) / 14H  8)  DZDTHT = 4X 26HZSUM
    71/ZSUM2 (CONSTANT TAU) / 14H  9)  DZDTAU = 4X 28HZSUM3/ZSUM2 (CONS
    8TANT THETA))
7011 FORMAT(75H 10)  ALL QUANTITIES INDEXED WITH I ARE SPECIES DEPENDEN
    1T AND CELL CONTAINS / 20X 55HQUANTITY FOR LAST SPECIES IN MATERIAL
    2 (I.E. I = NOLMNT))
7012 FORMAT(60H 11)  SNAFU CONTAINS  A) 19TH ITERATE OF Z BAR IF IS .EQ
    1. 20 / 12X  2HOR 8X 28HB) Z BAR IF Z BAR .GT. ZMEAN / 85H 12)  GAM
    2MA IS DEFINED AS THE DIMENSIONLESS DEGENERACY PARAMETER IN THE SAH
    3A EQUATION / 46H 13)  LNGAMA IS THE NATURAL LOGARITHM OF GAMMA /
    496H 14)  NSUBE= (6.0245E23)*ZBAR*RHO/(MEAN ATOMIC WEIGHT), THE NUM
    5BER DENSITY OF ELECTRONS (NO./CC) / 96H 15)  THCNST =    EION(10)
    6- EION(1) + EION(13) + EION(7) I THERMODYNAMIC CONSISTENCY DEVIATI
    7ON / 81H 16)  RELCNS =     THCNST/EION(10) I RELATIVE THERMODYNAMIC
    8 CONSISTENCY DEVIATION //)
7013 FORMAT(107H  THE NEXT 1 TO 5 LINES (DEPENDING ON THE NUMBER OF ELE
    AMENTS,1 TO 5) ARE Z(2) ONWARD, 10 VALUES PER ELEMENT /123H  IF THE
    B MATERIAL IS CH2 THE NEXT 2 LINES ARE THE TLMSB ARRAY, IF THE MATE
    CRIAL IS CARBON THE NEXT LINE IS THE CARBNZ ARRAY, /40H  OTHERWISE
    DTHESE LINES WILL NOT APPEAR./ 93H  THE NEXT LINES ARE I1 TO I10,M(
    E1),(M(K),K=4,KK,10),MATERL,ILEMNT,J1 TO J7,KK=(10*NOLMNT-6) /30H0
    FEXPLANATION OF SYMBOLS ABOVE /67H  1)  NOLMNT =     M(1)    IS THE N
    GUMBER OF ELEMENTS IN THE MATERIAL / 44H  2)  MATERL IS THE SPUTTER
    H MATERIAL NUMBER / 29H0 TWO LINES MAY NEXT APPEAR: /3X,126H IF NOL
    IMNT=1, A LINE PRINTS WITH THE ATOMIC NUMBER, V(J-1), AND V(J)  (WH
    JERE  V(J-1).LT.SYNPOT.LE.V(J)  WAS USED IN THE EIONX /3X,46H SUBRO
    KUTINE UNLESS  (J-1)=0  OR  J=ATOMIC NO.) /3X,111H IF IPRNT0=1, A L
    LINE PRINTS WITH SNAFU, GAMMA, LNGAMA, PHI, TLMS(10), NSUBE, THCNST
    M, RELCNS, DPDTAU, EION(14). /
    N                                                 45H  THE LAST LINE IS
    OEGAM, EGAM2, EGAM3, EIONIZ  //6X,29H EGAM= 1.+P1*SV/(E-ECHCK(18))
    P/6X,18H EGAM2= 1.+P1*SV/E /6X,48H EGAM3= 1.+EION(7)+EION(2)/(1.5*T
    QLMS(9)*EION(1)) /6X,42H EIONIZ= ENERGY-(1.5*THETA*XI) +ECHCK(18) )
7014 FORMAT(23H1 EOSPAR ARRAY CONTAINS/(1P10E12.5))
7015 FORMAT(61H0BLACK-BODY RADIATION CONTRIBUTION INCLUDED BY SUBROUTIN
    2E EOS)
7016 FORMAT(20H  MARI DECK CONTAINS/(1P10E12.5))
7018 FORMAT(20H0 EGAM (USES E-E0) = 1PE10.3, 5X 16HEGAM2 (USES E) =
    2 E10.3, 5X 23HEGAM3 (USES TRANSL E) = E10.3, 5X 8HEIONIZ = E10.3)
7019 FORMAT(7H0THETA=,1PE12.5,5H RHO=,E12.5,15H (RHO/RHOZERO)=,E12.5,10
    1H PRESSURE=,E12.5,
    216H EIONX PRESSURE=,E12.5,/10X,25H ((P1(1)-P EIONX)/P1(1))=,E12.5,
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     326H((P1(1)-P EIONX)/P EIONX)=,E12.5 )
 7020 FORMAT (24H1THE MATERIAL NUMBER IS ,I3)
 7021 FORMAT(1H1,5X,5HTHETA,7X,3HRHO,8X,2HP1,9X,1HE,4X,6HCAPAR/,4X,6HCAP
     2AC/,5X,3HFEW,8X,2HCV,7X,3HPB1,7X,3HASQ,6X,4HEGAM,4X,6HEGAM2//44X,6
     3HEIONIZ,4X,6HSYNPOT,53X,5HGAMMA/(1H  ,1P6E10.3,0PF8.5,1P5E10.3))
 7022 FORMAT (1H1 ,(1P6E10.3,0PF8.5,1P5E10.3))
 7023 FORMAT (16H0COMPOSITION IS ,10X,1HZ,8X,4HPART ,//(24X,F4.0,4X,
     1         F9.8))
 7024 FORMAT (1H0,30X,14HZMEAN        = ,0PF8.3/31X,14HPHI          = ,1PE
     112.5/31X,14HAMEAN        = ,0PF9.3/31X,14HENERGY ZERO = ,1PE12.5)
 7025 FORMAT (85H1 TIMES RECORDED PER GOLEM RUN ARE AS FOLLOWS  (ALL TIM
     AES ARE IN MILLISECONDS), WHERE / 87H  1)  XNPTS = TOTAL NUMBER OF
     BTHETA-RHO COMPUTATIONAL POINTS FROM THE LAST INPUT CARD  / 87H  2)
     C  SUMPTS = TOTAL NUMBER OF THETA-RHO COMPUTATIONAL POINTS IN THE E
     DNTIRE GOLEM RUN. / 22H0 QUANTITY    MEANING    // 54H  TIME1     TI
     EME1 IS THE TIME AT THE START OF THE RUN / 70H  TIME2      TIME2 IS
     F THE TIME PRECEDING EACH CALL TO EOS (OR EOSMOT) /72H  TIME3
     GTIME3 IS TIME UPON RETURN FROM EACH CALL TO EOS (OR EOSMOT) // 101
     HH  TIMEA       TIMEA = (TIME3 - TIME2)*16.666667, THE SUM OF TIMES
     IUSED DURING CALLS TO EOS (OR EOSMOT) / 118H  TIMEB      TIMEB = (T
     JIME3 - TIME1)*16.666667, TOTAL TIME USED BETWEEN START OF RUN AND
     KLAST CALL TO EOS (OR EOSMOT) /13X,24HFOR THE LAST INPUT CARD. /
     L106H  TIMEC       TIMEC = TIMEA/XNPTS, TIME USED PER CALL TO EOS (O
     MR EOSMOT) PER THETA-RHO COMPUTATIONAL POINT. / 112H  TIMED       TI
     NMED = TIMEB/SUMPTS, TIME USED BETWEEN START OF RUN AND LAST CALL T
     OO EOS (OR EOSMOT) PER THETA-RHO / 13X, 20HCOMPUTATIONAL POINT. )
 7026 FORMAT (10H0 TIME1 = , F14.6,10X, 8HTIMEA = ,F14.6,/10H  TIME2 = ,
     1F14.6,10X, 8HTIMEB = ,F14.6,/10H  TIME3 = ,F14.6,10X,8HTIMEC = ,
     2F14.6,/10H  XNPTS = ,F14.6,10X,8HTIMED = ,F14.6,/11H  SUMPTS = ,
     3F13.6)
 7100 FORMAT(1H0,3X,7H THETA=,1PE12.5,5H RHO=,E12.5,4H SV=,E12.5,6H OKLM
     2=,0PF6.1,7H CAPAR=,1PE12.5,7H CAPAC=,E12.5,5H FEW=,E12.5)
C
C   ************************ PUNCH FORMATS  ***********************
C
  704 FORMAT( 1HA, I4, F9.3, 1P5E10.4, 0PF8.5, 1PE8.2 )
  711 FORMAT( 1HB, I4, F9.3,1PE10.4,E8.2,2E10.4,0PF11.3,1PE9.4,E8.2)
  713 FORMAT(1HC, I4, F9.3, 1P5E10.4, 0PF6.2, 1PE10.4)
  714 FORMAT(1HD, I4, F9.3, 1P5E10.4, 0PF8.5, 1PE8.2)
  721 FORMAT(1HE,I4,F9.3,6E9.3,2F6.3)
  723 FORMAT(1HH,I1,F9.3,1P7E8.2,0PF5.2,E8.2)
  727 FORMAT(1HG,I4,F9.3,1P6E11.3)
  731 FORMAT (1HI,I4,F9.3,1P6E10.3,0PF6.2)
 7101 FORMAT(1HF,I4,F9.3,1P4E10.4)
 7700 FORMAT(1HA 1X 5HMOXIE 2X 5HTHETA 3X 3HRHO 7X 1HP 9X 1HE 9X 2HCV 8X
     .          3HPB1 6X 3HFEW 5X 5HASQ -)
 7701 FORMAT(1HB 1X 5HMOXIE 2X 5HTHETA 3X 3HRHO 7X 1HP 9X 1HE 8X 5HGAMMA
     .          4X 6HSYNPOT 3X 3HFEW 5X 7HEIONIZ-)
 7702 FORMAT(1HC 1X 5HMOXIE 2X 5HTHETA 3X 3HRHO 6X 6HDPDTAU 4X 6HDPDTHT
     .          4X 6HDZDTAU 4X 6HDZDTHT 3X 4HNBAR 4X 6HNSUBE-)
 7703 FORMAT(1HD 1X 5HMOXIE 2X 5HTHETA 3X 3HRHO 7X 1HP 9X 1HE 9X 4HEGAM
     .          5X 5HEGAM2 5X 3HFEW 4X 6HECHCK-)
 7704 FORMAT(1HE,1X,5HMOXIE,6H THETA,3X,4H RHO,6X,2H P,7X,2H E,6X,5H EIO
     2N,4X,5H KROS,4X,5H KPLK,1X,5H ZBAR,1X,6H EGAM-)
 7705 FORMAT(1HF,1X,5HMOXIE,6H THETA,4X,4H RHO,6X,4H FEW,5X,6H CAPAR,4X,

     26H CAPAC,26X,1H-)
 7706 FORMAT(1HH,17H MOXIE THETA RHO ,3X,6H EMOL ,3X,3H P ,2X,45H DEDTAU
     2  DEDTHT  DPDTAU  DPDTHT  NBAR ECHCK- )
 7707 FORMAT(1HG,1X,5HMOXIE,6H THETA,3X,4H RHO,8X,6HRELPHS,5X,6HRELENG,
     15X,5HRELE2,6X,6HRELZBR,5X,7HRELION- )
 7720 FORMAT(1HM,13H MOXIE THETA ,2X,5H RHO ,5X,3H P ,6X,3H E ,4X,35H DE
     2DTHT   DEDTAU   CAPAR   LAMBDA- )
 7721 FORMAT(1HM,I4,F9.3,1P7E9.3)
 7722 FORMAT(5HMOXIE,2X, 5HTHETA,6X,3HROW,9X,2HP1,9X,2HP2,7X,6HREL P1,5X
     1,6HREL P2,7X,5HE    -)
      END
```

GOLEM INPUT CARD FORMAT (continued)

COLUMNS	FORMAT	DATA
1-4	F4.0	OKLM(1)
5-8	F4.1	TRAIL

9	I1	IPRNT 0
		If (IPRNT0 .EQ. 0), print
		If (IPRNT0 .EQ. 1), no print
		If (IPRNT0 . EQ. 2), print GOLOUT Array only (no titles)
		If (IPRNT0 .EQ. 3), print GOLOUT Array with titles

10	I1	IPNCH0
		If (IPNCH0 . EQ. 0) punch
		If (IPNCH0 . EQ. 1) no punch
		If (IPNCH0 . EQ. 2. OR. IPNCH0. EQ. 3) . AND. TRAIL. EQ. 11.) punch DIAPHANOUS input in standard output format
		If (IPNCH0. EQ. 3. OR. IPNCH0. EQ. 4) . AND. TRAIL. EQ. 11.) punch RELE2, RELZBR, RELICN, RELPRS, RELENG

11-20	F10.0	THETA(1)
21-35	E15.8	RHO(1)
36-50	E15.8	SV(1)
51-54	F4.0	TEST
55-66	E12.6	DELTHT
67-78	E12.6	DELTAU
79-80	I2	J

These quantities are used as follows:

OKLM(1): A material number used to specify the substance under study. A list of the material numbers used by the SPUTTER code is present in the DIAPHANOUS writeup, earlier in this volume.

TRAIL: The specifier of the path (through the temperature-density plane) to be studied

IPRNT0: Controls the type of printout

IPNCH0: Controls the kind of punch output

THETA: Specifies the first input temperature (if one is required)

RHO: Specifies the first input density (if one is required). Either RHO or TAU (see next quantity) may be input

TAU: Specifies the first input specific volume (if one is required). Either RHO or TAU may be input

TEST: This field is used only to distinguish TRAIL cards from other possible GOLEM input cards

DELTHT: Specifies either the increment in temperature or the second input temperature (if either is required)

DELTAU: Specifies either the increment in density or in specific volume or a second input density (if any of these are required)

J: This field is not presently used

The possible trails through the temperature-density plane that can be used are:

TRAIL OPTIONS

TRAIL = 0.	Normal grid of temperature-density points (see next page)
TRAIL = 1.	Special ZMEAN path
TRAIL = 2.	Perfect gas and read one card per point
TRAIL = 3.	Read one card per point
TRAIL = 4.	Compute (THETA, TAU) rectangle around central point
TRAIL = 5.	Normal grid of selected temperature-density points
TRAIL = 6.	Molecular equation-of-state checkout set
TRAIL = 7.	Compute (THETA, RHO) rectangle around central point
TRAIL = 8.	Grid of temperature-low density (. LE. 0. 1) points
TRAIL = 9.	Grid of temperature-high density (. GE. 0. 01) points
TRAIL = 10.	Grid of densities-low temperature (. LE. 10 eV)
TRAIL = 11.	Read DIAPHANOUS data card
TRAIL = 12.	Read GILMORE data card
TRAIL = 13.	Read HILSENRATH data card
TRAIL = 14.	Normal temperature set at one selected density
TRAIL = 15.	Normal density set at one selected temperature

The normal grid of points takes advantage of a set of temperatures, the THETA array, the RHO array, and densities that are built into the program in the form of data statements. These two data statements and a third, the EOSPAR array, (containing the parameters required by various equation-of-state or opacity subroutines) are gathered together in a block data program (called the KONTRL block data program). The temperature and density arrays so specified can be changed at will. Thus, the normal path is really as variable as desired. In practice, a standard set of temperatures and densities have been used. They are:

Normal THETA array	/0.025, 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1., 1.5,
1	2.25, 3.4, 5., 7., 10., 15., 22.5, 34., 50., 70., 100.,
2	150., 225., 340., 400., 500., 600., 700., 800., 900.,
3	1.E3, 1.5E3, 2.25E3, 3.4E3, 5.E3, 7.E3, 1.E4, 210*0.
Normal RHO array	/75., 50., 25., 10., 5., 2., 1.5, 1., 0.5, 0.1, 1.E-2. 1.E-3,
1	1.E-4, 1.E-5, 1.E-6, 1.E-7, 1.E-8, 1.E-9,
2	1.0000001E-10, 1.E-11, 1.E-12, 1.E-13, 1.E-14, 227*0.

Similarly, the standard set of input parameters in the EOSPAR array (which specifies quantities used by the subroutines) is:

Normal EOSPAR array	/0., 488., -1.E38, 1.E38, 6*0.,
1	7*0., 1.E-18, 1.E-3, 0.,
2	1., 0., 1., 2., 2*0., 3., 2*0., 1.5,
3	8*0., 1., 8.2E11,
4	1., 2., 8*0.

These array elements are used in the following way:

EOSPAR(1)	Controls usage of molecular equation-of-state by EIONX to allow ES1LMS, AIRMOL, and CMOL, set EOSPAR(1). NE. 0.
EOSPAR(2)	Equals number of entries in MARI deck
EOSPAR(3)	Free parameter
EOSPAR(4)	Free parameter
EOSPAR(5)	Controls ECHCK(18)
EOSPAR(5)	Controls energy zero choice - see comment below
EOSPAR(5) =	5.98566E11 ergs/gm for atomization energy of carbon using CMOL
EOSPAR(5) =	9.63E11 ergs/gm for ES1LMS CH2 computations
EOSPAR(5) =	2.899E11 ergs/gm for dissociation energy of air for AIRMOL
EOSPAR(6)	Controls EIONIN(1)
EOSPAR(7)	Controls EIONIN(2)
EOSPAR(8)	Controls EIONIN(3)
EOSPAR(9)	Controls EIONIN(4)
EOSPAR(10)	Controls EIONIN(5)
EOSPAR(11)	Controls EIONIN(6)
EOSPAR(12)	Controls EIONIN(7)
EOSPAR(13)	Controls EIONIN(8)
EOSPAR(14)	Controls EIONIN(9)
EOSPAR(15)	Controls EIONIN(10)
EOSPAR(16)	Controls EIONIN(11) These 11 cells can be used to enter a special material composition to EIONX codes. Set EOSPAR(6) = the number of elements in the material. Set EOSPAR(7) through (16) = successive sets of (atomic number, atom number fraction) EOSPAR(6) . LT. 5. 5 is required
EOSPAR(17)	Controls EIONIN(28)
EOSPAR(17)	For CMOL only Equivalence (EIONIN(28), FESTER), controls choice of run, full-equilibrium or translation-only Use EIONIN(28) . EQ. -1. for translation-only treatment Use EIONIN(28) . EQ. +1. for full-equilibrium treatment at GGA; · EQ. 0. or +1. for full equilibrium treatment at AFWL. for identity of results, use same value of EIONIN(28) at GGA and AFWL.

EOSPAR(18)	Controls EIONIN(29) Equivalence (EIONIN(29), ZBRMIN), controls minimum allowed ZBAR
EOSPAR(19)	Controls EIONIN(30) Equivalence (EIONIN(30), EPSI), controls ZBAR for EIONX iteration test
EOSPAR(20)	Controls M2
EOSPAR(21)	Controls RPIA Set EOSPAR(21) . EQ. 0. to include radiation contributions in EOS. Set EOSPAR(21) . NE. 0. to avoid radiation contributions in EOS
EOSPAR(22)	Controls PUSHA
EOSPAR(23)	Controls MAXLM
EOSPAR(24)	Controls LMDA(2)
EOSPAR(25)	Controls SOLID(18)
EOSPAR(26)	Controls SCYCLE
EOSPAR(27)	Controls NR Set EOSPAR(27) . GE. 2. for path = 0. in EIONX Set EOSPAR(27) . LE. 1. for path = -3. in EIONX
EOSPAR(28)	Controls IAM1
EOSPAR(29)	Controls IB
EOSPAR(30)	Controls CVA
EOSPAR(31)	Controls SOLID(17)
EOSPAR(32)	Controls RIB
EOSPAR(33)	Controls HVA
EOSPAR(34)	Controls HCA
EOSPAR(35)	Controls AMASNO(1)
EOSPAR(36)	Controls EOS Set EOSPAR(36) . NE. 0. to avoid EOS Set EOSPAR(36) . EQ. 0. to call EOS
EOSPAR(37)	Controls KAPPA Set EOSPAR(37) . NE. 0. to call KAPPA
EOSPAR(38)	Controls CHRNO(1)
EOSPAR(39)	Controls OKLM(18)

EOSPAR(40)	Controls CMIN = 8.2E11
EOSPAR(41)	Controls LMDA(1)
EOSPAR(42)	Controls MAXL
EOSPAR(43)	Controls S2, normal value = 0
EOSPAR(44)	Controls MARK, the AIRMOL control parameter MARK is equivalenced to EIONIN(28). Set EOSPAR(44) to +2., 0., or -2. to achieve desired results. +2. is standard value

Remaining cells free.

The main print and punch options are:

IPRNT0 = 0 :	Normal printout with all debug and intermediate quantities
IPRNT0 = 1 :	Limited printout with main thermodynamic variables
IPRNT0 = 2 :	Tabular output without captions
IPRNT0 = 3 :	Tabular output (with titles) of θ, ρ, P, E, $\overline{Z}$, $(\partial E/\partial \theta)_\tau$, $(\partial E/\partial \tau)_0$, the speed of sound, EGAM = 1 + P/ρE, and several other variables
IPNCH0 = 0 :	Punches all thermodynamic quantities computed by subroutines
IPNCH0 = 1 :	No punch output

No matter which printout format is chosen, a page explaining all quantities is printed. On this page the units used, some relations used, and some definitions for several variables used are discussed.

If the option to punch cards is exercised, the different types of cards are prefaced by title cards and made sortable, together with the title cards, by a distinguishing character punched in column 1 of the card.

The input requirements of the various trails are simple: wherever any temperature-density point is the single or central point of a path to be studied, those values are input to THETA and RHO (or THETA and TAU). If increments are required, the values are input into DELTHT and DELTAU (DELTAU is also used for $\Delta\rho$ if needed). If a trail requires upper and lower temperatures, the upper one is input into DELTHT and the lower one is input to THETA. If upper and lower densities are required, they are

STANDARD OUTPUT FORMAT

```
OUTPUT LINE 1
THETA (EV), RHO (G/CC), SV (CC/G), P (DYNES/CM SQ), E (ERGS/G), CV (ERGS/G/EV), PDI (ERGS/CC), FEW, ASO (CM/SEC)

EION ARRAY CONTAINS
OUTPUT LINES 2, 3
THETA (EV), TAU (CC/G), ZBAR, ZBAR2, PHI, CSUM, PRESUR (DYNES/CM SQ), ENERGY (ERGS/G), DEDTHT (ERGS/GM/EV), DEDTAU (ERGS/CC)
SNDSPD (CM/SEC), DPDTAU (ERG-G/CC SQ), DPDTHT (DYNES/CM SQ/EV), FAILURE RECORD, NSUBE,  ZMEAN, NBAR, ZSUM1, ZSUM2, ZSUM3

EXPLANATION OF SYMBOLS ABOVE
1)  TAU =       SPECIFIC VOLUME (CC/G)
2)  ZBAR =      MEAN ION CHARGE (NO. OF ELECTRONS / NO. OF IONS)
3)  PHI =       0.0000T0E11 / MEAN ATOMIC WEIGHT
4)  ALL DERIVATIVES W.R.T. TAU (DEDTAU, DPDTAU) ARE AT CONSTANT THETA.
5)  ALL DERIVATIVES W.R.T. THETA (DEDTHT, DPDTHT) ARE AT CONSTANT TAU.
6)  SNDSPD = ((PARTIAL PRESUR)/(PARTIAL DENSITY)) AT CONSTANT ENTROPY.
7)  FAILURE RECORD CONTAINS THE ERROR FLAG AFTER CATASTROPHIC ERRORS.
8)  NBAR        MEAN NO. OF ATOMS PER MOLECULE.  IT DIFFERS FROM UNITY IF MOLECULAR EQUATIONS-OF-STATE SO COMPUTE IT.

TLHS ARRAY CONTAINS
OUTPUT LINES 4, 5, 6, 7
BACK1, BACK2, MEAN ATOMIC WEIGHT, 0 VERIFY, LN(GAMMA*ZBAR), ABAR(I), ZBARLN, SIGMA, AI, SYNTHETIC POTENTIAL (1+THETA*LNGAMA)
ZBAR + BACK2 - 2*BACK1, ZBAR - BACK1, VI(I,J) - VI(I,J-1), SUMPOT, DZDTAU, DZDTH., THE NEXT 12 VALUES VARY .
SNAFU,GAMMA,LNGAMA,NSUBE,THCNST,RELCNS

EXPLANATION OF SYMBOLS ABOVE
1)  BACK1 IS PREVIOUS ZBAR ITERATE
2)  BACK2 IS SECOND PREVIOUS ZBAR ITERATE
3)  ABAR(I) IS RELEVANT MOLE FRACTION
4)  SIGMA (USED IN EIONNB) IS VARIABLE
5)  AI =        PHI * (1./NBAR + ZBAR)
6)  VI(I,J) IS THE JTH IONIZATION POTENTIAL (1 .LE. J .LE. Z(I))
                FOR THE ITH ELEMENT OF THE MATERIAL
7)  SUMPOT (USED IN EIONNB) SUMS THE FIRST (J-1) POTENTIALS WHERE I .LE. V(J)
8)  DZDTHT =    SUM1/ZSUM2 (CONSTANT TAU)
9)  DZDTAU =    SUM3/ZSUM2 (CONSTANT THETA)
10) ALL QUANTITIES INDEXED WITH I ARE SPECIES DEPENDENT AND CELL CONTAINS
                QUANTITY FOR LAST SPECIES IN MATERIAL (I.E. I = NOLMNT)
11) SNAFU CONTAINS  1) 10TH ITERATE OF Z BAR IF IS .EQ. 0R
        OR          2) Z BAR IF Z BAR .GT. ZMEAN
12) GAMMA IS DEFINED AS THE DIMENSIONLESS DEGENERACY PARAMETER IN THE SAHA EQUATION
13) LNGAMA IS THE NATURAL LOGARITHM OF GAMMA
14) NSUBE (6.0248E23*ZBAR*RHO/(MEAN ATOMIC WEIGHT), THE NUMBER DENSITY OF ELECTRONS (NO./CC)
15) THCNST =    EION(10) - EION(1) * EION(13) + EION(7) , THERMODYNAMIC CONSISTENCY DEVIATION
16) RELCNS =    THCNST/EION(10) , RELATIVE THERMODYNAMIC CONSISTENCY DEVIATION

THE NEXT 2 TO 8 LINES (DEPENDING ON THE NUMBER OF ELEMENTS,1 TO 8) ARE Z(I) ONWARD, 10 VALUES PER ELEMENT
IF THE MATERIAL IS CH2 THE NEXT 2 LINES ARE THE TLHSO ARRAY. IF THE MATERIAL IS CARBON THE NEXT LINE IS THE CARBNZ ARRAY,
OTHERWISE THESE LINES WILL NOT APPEAR.
THE NEXT LINES ARE (I TO 1(10*N(1)),(N(I)(,NDS,EA,10),MATERL,ILEMNT,J) TO J7,EAR(IO*NOLMNT-6).

EXPLANATION OF SYMBOLS ABOVE
C)  NOLMNT =    N(1)   IS THE NUMBER OF ELEMENTS IN THE MATERIAL
D)  MATERL IS THE SPUTTER MATERIAL NUMBER

TWO LINES MAY NEXT APPEAR:
  IF NOLMNT=1, A LINE PRINTS WITH THE ATOMIC NUMBER, V(J-1), AND V(J)  (WHERE  V(J-1).LT.SYMPOT.LE.V(J)  WAS USED IN THE EIONNB
  SUBROUTINE VALUES  (J-1)=2  OR  JATOMIC NO.)
  IF IPRNT=1, A LINE PRINTS WITH SNAFU, GAMMA, LNGAMA, PHI, TLHS(10), NSUBE, THCNST, RELCNS, DPDTAU, EION(10).
THE LAST LINE IS EOAM, EOAMB, EOAMJ, EIONIE

     EOAM= C.*PI*SV/(E-ECNCR(10))
     EOAMB= C.*PI*SV/E
     EOAMJ= 1.+E.DN(7)*EION(8)/(1.+TLHS(8)*EION(1))
     EIONIE= ENERGY-(1.+THETA*AI) *ECNCR(10)
```

input into DELTAU and RHO (or TAU), respectively. If some subset of the normal θ set is used, then only the needed density need be input, and vice versa. For further guidance consult the code.

Note that although the GOLEM code is lengthy and appears complicated, it has an extremely simple logical structure on any given trail. Each trail generates a member of a set of temperature-density points. The equation-of-state or opacity subroutine is then called to compute the thermodynamic data relevant to this temperature-density point. These data are then either printed, punched (or both), or stored in an array for later printout. The trail next generates the succeeding temperature-density point and the process is repeated. Any number of trail-specifying input cards may be stacked in a given run.

Finally, further development of the GOLEM code will couple it to a plotting routine, GRAPH (which can already couple with the DYPER4 and TRANS codes). Examples of GOLEM output for the AIRMOL subroutine are given in Appendix I. An example is also given for the CMOL subroutine in reference 4.

MARIER: AN ISOELECTRONIC IONIZATION POTENTIAL PREDICTOR

MARIER does 2nd- or 4th-order least-square fits to a given isoelectronic sequence of ionization potentials.

The program contains one read statement:

```
READ (5, 7701) KSTART, KEND, LASTZ, LOWERGO, LOWERZ,
               NEXT, LORDER, LREDUC, LSTEP, MORE
7701 FORMAT (10 (I2, 2X))
```

The meaning of these variables is:

KSTART	is the lowest atomic number used in the first isoelectronic sequence done
KEND	is defined by: (KEND-KSTART+1) isoelectronic sequences are done
LASTZ	is the highest atomic number used in any isoelectronic sequence

```
      PROGRAM MARIER(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
      COMMON/LMSH/U(1)
      DATA KPREV, KSTART, KEND, LASTZ  /4* 0/  IM/0/  IM2/0/
      DIMENSION X(100),Y(100), COEF(8,100),COE(5),POTENL(100),KATNO(100)
      REAL MARIAN
      DIMENSION MARIAN(100,100)
      DIMENSION MATNO(100)
      DIMENSION XX(3),YY(3),COE2(3)
      DATA  L3/3/ L2/2/
      DATA  DEVEAT/0./  POTENL/100*0./   DEVIAT/0./
C
C
C
C     ASSUME MARI DECK USED HAS ELEMENTS IN MONOTONE INCREASING ORDER
C       FOLLOWED BY ISOTOPIC MIXTURES
C
C     MARI DECK IS ASSUMED TO CONTAIN ONE OR TWO SPECIFICATIONS FOR EACH
C       ELEMENT. (THE SECOND SPECIFICATION WILL ORDINARILY BE USED FOR
C       SPECIAL ISOTOPIC MIXTURES.) THIS PROGRAM WILL USE DATA FROM THE
C       FIRST SPECIFICATION FOR A GIVEN ELEMENT. THE MARI DECK ENDS WITH
C       A ZERO.
C
C
    1 CONTINUE
      READ (5,7701) KSTART, KEND, LASTZ, LOWRGO, LOWRZ, NEXT, LORDER,
     1              LREDUC, LSTEP, MORE
 7701 FORMAT(10(I2,2X))
C
C
C      KSTART IS THE LOWEST ATOMIC NUMBER USABLE IN THE FIRST ISOELEC-
C        TRONIC SEQUENCE DONE
C     KEND IS DEFINED BY:(KEND-KSTART+1) ISOELECTRONIC SEQUENCES ARE
C       DONE
C      LASTZ IS THE HIGHEST ATOMIC NUMBER USED IN ANY ISOELECTRONIC
C        SEQUENCE
C     KPREV IS THE VALUE OF KEND USED ON THE PREVIOUS DATA CARD. IT
C        IS INITIALLY SET TO ZERO.
C      LOWRGO SPECIFIES THE INDEX OF THE FIRST TERM IN THE ISOELECTRO-
C        NIC SEQUENCE WHICH IS ACTUALLY USED IN THE CALCULATION.
C      LOWRZ SPECIFIES THE LOWEST ATOMIC NUMBER WHICH CAN BE USED IN A
C        CALCULATION.
C      NEXT SPECIFIES THE CORE PARAMETER FOR SUBROUTINE DEBUG. IF NEXT
C        EQUALS ZERO, PRINT MESSAGE AND CONTINUE RUN. IF NEXT.NE.0,
C        PRINT MESSAGE AND CALL MERR
C      LORDER SPECIFIES FITTING POLYNOMIAL ORDER
C      IF LREDUC EQUALS 0, LORDER WILL ORDINARILY BE 4. IF LREDUC.NE.0
C        LORDER WILL ORDINARILY BE 3
C     IF LORDER .GT. 4 IS USED, REDIMENSION COEF ARRAY TO COEF(LORDER+4,
C       100) AND COE ARRAY TO COE(LORDER+1)
C      LREDUC .EQ. 0 USES IONIZATION POTENTIALS. LREDUC .NE. 0 USES
C        IONIZATION POTENTIALS DIVIDED BY TERM INDEX
C
C      LSTEP CAN BE USED TO MODIFY THE TERM INDEX VALUE (I.E. WE COULD
C        CALL THE INITIAL TERM INDEX THE (1+LSTEP-TH) TERM.)
C
      WRITE (6,7702) KSTART,KEND,LASTZ,KPREV,LOWRGO,LOWRZ,NEXT,LORDER,
```

```
     1                 LREDUC, LSTEP, MORE
 7702 FORMAT (18H1INPUT AS READ WAS/ 8H KSTART=,I3, 6H KEND=,I3, 7H LAST
     1Z=,I3, 7H KPREV= , I3, 8H LOWRGO= ,I3, 7H LOWRZ= ,I3,6H NEXT= ,I3,
     28H LORDER=,I3, 8H LREDUC=,I3, 7H LSTEP=,I3,6H MORE=,I3)
C
         IF (KSTART.EQ.0) KSTART=1
         IF (LASTZ .EQ.0) LASTZ= 92
      IF(KEND.EQ.0 .OR. KEND .GT. LASTZ ) KEND=LASTZ
      IF(KSTART .GT. KEND) KSTART=KEND
         IF (LOWRGO .EQ.0) LOWRGO=1
         IF (LORDER .EQ. 0) LORDER=4
      IF (KPREV.EQ.KEND.AND.LOWRZ.EQ.1) CALL EXIT
C     TO END RUN, DUPLICATE THE LAST DATA CARD BUT SET LOWRZ=1.  THIS
C      IS THE LAST REQUIRED INPUT CARD AND WILL CALL EXIT.
      WRITE(6,7001)KSTART,KEND,LASTZ,KPREV,LOWRGO,LOWRZ,LORDER,LREDUC
     1,LSTEP,MORE
 7001 FORMAT(24H PARAMETERS AS USED WERE/8H KSTART=,I3,6H KEND=,I3,7H LA
     1STZ=, I3,7H KPREV=,I3, 8H LOWRGO= ,I3  , 7H LOWRZ= ,I3,
     28H LORDER=,I3, 8H LREDUC=,I3, 7H LSTEP=,I3,6H MORE=,I3)
C
      KPREV= KEND
      KCOUNT=KEND-KSTART+1
C
C
C
C
      DO 308 I=1,100
      DO 308 J=1,100
      MARIAN(I,J)=0.
  308 CONTINUE
      DO 90 I=1,6
      DO 90 I2=1,100
      COEF (I,I2)=0.
   90 CONTINUE
  101 CONTINUE
      DO 500 K= KSTART, KEND
C
C     DO ALL SEQUENCES BETWEEN KSTART AND KEND INCLUSIVE.
C
C     THE K-TH SEQUENCE FITS THE (LASTZ-K+1) IONIZATION POTENTIALS
C
C        K      K+1        KK           LASTZ
C       V   ,  V     ,...., V       ,...., V
C        1      2          LOWER        LASTZ-K+1
C
C
C     USING J.GRATTEAUS LEAST-SQUARE POLYNOMIAL FIT SUBROUTINE
C     TO A QUADRATIC EQUATION.
C
C
      K2=            K+LOWRGO-1
      LSTORE=        0
  102 CONTINUE
      DO 103 KK= K2, LASTZ
C
```

```
C      THIS ISOELECTRONIC IONIZATION SEQUENCE HAS (LASTZ-K +1) ELEMENTS
C      WHICH STORE INTO THE Y ARRAY. SOME MAY BE ZERO IN THE MARI DECK OR
C      MAY BE MISSING. IF SO, THE SEQUENCE HAS THESE ELEMENTS MISSING IN
C      THE Y ARRAY AND HAS LESS THAN (LASTZ-K+1) TERMS
C
C      LOWER SPECIFIES WHICH IONIZATION POTENTIAL IS USED
C      KK SPECIFIES THE ATOMIC NUMBER OF THE SUCCESSIVE SEQUENCE TERMS
C      LSTORE SPECIFIES THE SEQUENCE INDEX (1,2,3,..LOWER.LE.(LASTZ-K+1))
C
C
       LOWER=        KK-K+1
   104 CONTINUE
       M=1
C      M SUBSCRIPTS ATOMIC NUMBERS IN THE MARI ARRAY
   105 KMARI=U(M)
          IF(KMARI .EQ. KK) GO TO  107
          IF (KMARI .EQ. 0) GO TO 103
C      THE ABOVE OCCURS WHENEVER THE KK-TH ELEMENT IS NOT IN THE MARI
C        DECK
   106 CONTINUE
       M=M+ KMARI+ 2
       GO TO 105
   107 CONTINUE
C      AT THIS POINT THE KK-TH ELEMENT HAS BEEN LOCATED
C      ITS LOWER-TH IONIZATION POTENTIAL WILL BE USED
C
C      TEST LOWER-TH IONIZATION POTENTIAL. IF ZERO, SKIP TO NEXT ELEMENT.
       IF (KMARI.LT.LOWRZ) GO TO 103
C
       INDEX=M+1+ LOWER
          IF(ABS(U(INDEX)).LT. 1.E-6 ) GO TO 103
C      WE NOW HAVE A VALID DATUM AND CAN ENTER IT INTO THE Y ARRAY.
       LSTORE=       LSTORE+1
       X(LSTORE)=    LOWER+LSTEP
       Y(LSTORE)=    U(INDEX)
          IF (LREDUC.NE.0) Y(LSTORE)=Y(LSTORE)/X(LSTORE)
       MATNO(LSTORE)= KK
       MARIAN(KK,LOWER)=U(INDEX)
   103 CONTINUE
C      AT THIS POINT, THE X AND Y ARRAYS HAVE BEEN SET UP.
C      THERE ARE LSTORE ENTRIES IN THESE ARRAYS
       LURDER=LORDER
       ILORDR=LORDER+1
       IF (LSTORE .LT. ILORDR .AND. LORDER .EQ. 4) LURDER=2
C
C
C
       CALL FIT (X, Y, LSTORE, LURDER, DEVEAT, IM, COE)
       IF (IM) 201,202,201
   201 CONTINUE
       WRITE(6,7703)LSTORE,LORDER,LOWER,(Y(J),MATNO(J),J=1,LSTORE)
       CALL DEBUG(201,202,NEXT)
       GO TO 500
   202 CONTINUE
       IF (LURDER.NE.LORDER)ILORDR=LURDER+1
```

```
      DO 203 J=1,ILORDR
      COEF( J, K  ) = COE(J)
  203 CONTINUE
      LAST=LOWER+8
C
C     EVALUATE SEQUENCE FROM POLYNOMIAL
      DO 204 J=1,LOWER
      XJ=J
      KATNO(J)= K-1+J
      POTENL(J)=COE(1)
      DO 91 I=2,ILORDR
      POTENL(J)=POTENL(J)+COE(I)*(XJ**(I-1))
   91 CONTINUE
      KKATNO = KATNO(J)
      IF (MARIAN(KKATNO,J) .EQ. 0.) MARIAN(KKATNO,J) = POTENL(J)
  204 CONTINUE
C
      NUXT=LOWER+1
C
      WRITE(6,7703)LSTORE,LORDER,LOWER,(Y(J),MATNO(J), J=1,LSTORE)
 7703 FORMAT(6H1USING,I3,25H IONIZATION POTENTIALS,3X,15HA FIT OF ORDER
     1,I2,8H TO THE ,I3,26H-TH ISOELECTRONIC SEQUENCE/3X,4HWITH,3X,
     212HINPUT VALUE    ,18H AT ATOMIC NUMBER /(10X,1PE10.4,14X,I3))
C
      WRITE(6,7002) (KATNO(J), J, POTENL(J), J=1,LOWER )
 7002 FORMAT(21H0HAS A FIT EVALUATION/3(8H FOR Z =,I3,6H AT J=,I3,11H,A
     1VALUE OF, 0PF9.1,3X))
C
 7704 FORMAT(29H FURTHER EVALUATED VALUES ARE /(3X,4H Z =,I3,3X,4H J =,
     1  I3,1PE15.8))
C
      IF (LORDER .EQ. 4) WRITE(6,7705) (COE(J),J=1,5)
      IF (LORDER .EQ. 2) WRITE(6,7707) (COE(J),J=1,3)
 7705 FORMAT(21H USING THE POLYNOMIAL ,5X,1PE14.8,6H  +J* ,1PE14.8,
     1 7H  +J*J* ,1PE14.8,10H  +J**3 * ,1PE14.8,10H  +J**4 * ,1PE14.8)
C
 7707 FORMAT(21H USING THE POLYNOMIAL ,5X,1PE14.8,6H  +J* ,1PE14.8,
     1 7H  +J*J* ,1PE14.8)
C
      WRITE(6,7003) DEVEAT
 7003 FORMAT(28H THE STANDARD DEVIATION WAS , 1PE12.5 )
C
C
C     MORE=0 FIT Z=93 TO 100 WITH INPUT IF AVAILABLE,OUTPUT IF NOT
C     MORE=1  FIT Z=93 TO 100 WITH INPUT ONLY
C     MORE=2  FIT Z=93 TO 100 WITH OUTPUT ONLY
C     MORE = 3      BYPASS FIT OF Z.GT.92
      IF (MORE.EQ.3) GO TO 500
      IF (MORE .EQ. 1) GO TO 501
C     PATH FOR MORE.EQ.2.OR.MORE.EQ.0
      XX(3)=LOWER
      YY(3)=POTENL(LOWER)
      XX(2)=LOWER-1
      YY(2)=POTENL(LOWER-1)
      XX(1)=LOWER-2
```

```
      YY(1)=POTENL(LOWER-2)
      IF(MORE.NE.0) GO TO 302
      IF (MATNO(LSTORE) .EQ. KATNO(LOWER)) YY(3)=Y(LSTORE)
      IF (MATNO(LSTORE-1) .EQ. KATNO(LOWER-1)) YY(2)=Y(LSTORE-1)
      IF (MATNO(LSTORE-2) .EQ. KATNO(LOWER-2))  YY(1)=Y(LSTORE-2)
  302 CONTINUE
      WRITE (6,7110)
 7110 FORMAT (30H0INPUT TO THE QUADRATIC FIT IS /)
      DO 401 LY=1,3
      LYY=LOWER-3+LY
      LYYY=XX(LY)
      WRITE(6,7109) KATNO(LYY),LYYY,YY(LY)
 7109 FORMAT (5X,18H AT ATOMIC NUMBER ,I3,10H WITH J  = ,I3,
     128H AN IONIZATION POTENTIAL OF ,1PE15.8)
  401 CONTINUE
      GO TO 303
  301 CONTINUE
C     PATH FOR MORE = 1
      XX(1)=X(LSTORE-2)
      XX(2)=X(LSTORE-1)
      XX(3)=X(LSTORE)
      YY(1)=Y(LSTORE-2)
      YY(2)=Y(LSTORE-1)
      YY(3)=Y(LSTORE)
      DO 100 LX=1,3
      LXX=LSTORE-3+LX
      LXXX=XX(LX)
      WRITE (6,7109) MATNO(LXX),LXXX,YY(LX)
  100 CONTINUE
  303 CONTINUE
      CALL FIT (XX,YY,L3,L2,DEVIAT,IM2,COE2)
      IF (IM2) 2001,2002,2001
 2001 CONTINUE
      WRITE (6,7703) L3,L2,(YY(J),MATNO(J),J=1,3)
      CALL DEBUG(2001,2002,NEXT)
      GO TO 500
 2002 CONTINUE
      DO 2003 J=6,8
      COEF(J,K)=COE2(J-5)
 2003 CONTINUE
C
C
      DO 2004 J=NUXT,LAST
      XJ=J
      KATNO(J)=K-1+J
      POTENL(J)=COE2(1)+COE2(2)*XJ+XJ*XJ*COE2(3)
      KKATNO=KATNO(J)
      MARIAN(KKATNO,J)=POTENL(J)
 2004 CONTINUE
      WRITE(6,7704) (KATNO(J), J, POTENL(J), J=NUXT,LAST)
      WRITE (6,7707) COE2
      WRITE (6,7003) DEVIAT
C
C
  500 CONTINUE
```

```
      WRITE (6,7006)
 7006 FORMAT (1H1)
C
C
      DO 600 J=1,100
      IF(J.GT.92 .AND. MORE.EQ.3 ) GO TO 600
      WRITE(6,7007)J
 7007 FORMAT (20H0FOR ELEMENT NUMBER ,I3, 31H, THE IONIZATION POTENTIALS
     1 ARE)
C
C
      DO 601 J2=1,J     ,10
      J4=  MIN0(J2+9,J     )
      WRITE (6,7005)      J2,(MARIAN(J,J3), J3=J2,J4)
 7005 FORMAT ( 1X,I3,3X,1P10E12.5)
C
  601 CONTINUE
  600 CONTINUE
C
      JLORDR=ILORDR+3
      IF(MORE.EQ.3) JLORDR=ILORDR
      IF(JLORDR.EQ.8)
     1    WRITE(6,7706) (J,(COEF(JJ,J),JJ=1,JLORDR),J=1,KCOUNT)
 7706 FORMAT (14H1COEF ARRAY I5/(4X,I3,1P5E15.8,3X,1P3E15.8))
      IF(JLORDR.EQ.6)
     1    WRITE(6,7708) (J,(COEF(JJ,J),JJ=1,JLORDR),J=1,KCOUNT)
 7708 FORMAT (14H1COEF ARRAY I5/(4X,I3,1P3E15.8,3X,1P3E15.8))
      IF(JLORDR.EQ.5)
     1    WRITE(6,7710) (J,(COEF(JJ,J),JJ=1,JLORDR),J=1,KCOUNT)
 7710 FORMAT (14H1COEF ARRAY I5/(4X,I3,1P5E15.8))
      IF(JLORDR.EQ.3)
     1    WRITE(6,7709) (J,(COEF(JJ,J),JJ=1,JLORDR),J=1,KCOUNT)
 7709 FORMAT (14H1COEF ARRAY I5/(4X,I3,1P3E15.8))
      GO TO 1
C
      CALL MARIE
      RETURN
      END
```

LOWRGO	specifies the index of the first term in the isoelectronic sequence that is actually used in the calculation
LOWERZ	specifies the lowest atomic number that can be used in a calculation
NEXT	is a debug parameter
LORDER	specifies the order of the polynomial fit
LREDUC	= 0 uses ionization potentials; LREDUC $\neq$ 0 uses (ionization potentials / term index) in the input to the polynomial fit
MORE	is used to decide on extrapolations for atomic numbers > 92

All sequences between the (KSTART)-th and the (KEND)-th inclusive are done. The kth sequence fits the (LASTZ-k+1) ionization potentials:

$$V_1^k, V_2^{k+1}, \ldots V_{LOWER}^{kk}, \ldots, V_{LASTZ-k+1}^{LASTZ}$$

(unless some of the initial members of the sequence are for elements with atomic numbers less than LOWERZ, in which case these terms are not used in the input to the least-squares fit). If the sequence of known ionization potentials contains less than 5 terms, a 2nd-order fit is tried even if LORDER = 4.

MARIER has been used with the block data program MARIE (see separate writeup) to calculate a tentative set of ionization potentials for the first 92 elements. Where present, experimental values have been used. (The sources for these are listed in the MARIE writeup.) Some further work on this task is needed; however, it is felt that further value changes will be within 10 percent of the presently assigned value.

MARIE: A BLOCK DATA PROGRAM OF IONIZATION POTENTIALS

The MARIE program is an intermediate step toward the final completion of the MARI block data program, a table of the ionization potentials of the elements. (See the writeup of program MARIER.)

```
      SUBROUTINE MARIE
C              LAST COMPILED FEB. 9, 1966 BY GARY LANE
C
C     THIS DECK CONTAINS FOR ALL ELEMENTS PRESENT
C                 A TABLE MADE UP OF THE FOLLOWING QUANTITIES, IN ORDER
C                 ATOMIC NUMBER OF THE ELEMENT
C                 ATOMIC WEIGHT OF THE ELEMENT
C                 IONIZATION POTENTIALS OF THE ELEMENT
C                 EITHER ALL IONIZATION POTENTIALS ARE ENTERED IN
C               . STRICTLY MONOTONIC ORDER OR MISSING ONES ARE ENTERED
C                  AS ZERO
C
C     DATA TAKEN FROM NBS 270-1, NBS 270-2; R.H.GARSTANG I.A.U.SYMP.26
C     (1966); ALLENS ASTROPHYSICAL TABLES, 3RD ED.; AND BERNE RUNS (USED
C     FOR XE, W, AND U).
C
C                                                                     MARI
      COMMON/LMSB/H (3)                                            H  1MARI
      DATA H/1., 1.008, 13.598/                                    H  2MARI
C
      COMMON/LMSB/HE (4)                                           HE 1MARI
      DATA HE/2., 4.0026, 24.586, 54.403/                          HE 2MARI
C
      COMMON/LMSB/LI (5)                                           LI 1MARI
      REAL LI                                                      LI 2MARI
      DATA LI/3.,6.939,5.39,75.619,122.419/                        LI 3MARI
C
      COMMON/LMSB/BE (6)                                           BE 1MARI
      DATA BE/4., 9.0122, 9.32, 18.206, 153.85, 217.657/           BE 2MARI
C
      COMMON/LMSB/B  (7)                                           B  1MARI
      DATA B/5., 10.811, 8.2979, 25.155, 37.929, 259.36, 340.21/   B  2MARI
C
      COMMON/LMSB/C  ( 8)                                          C  1MARI
      DATA C/6., 12.0112, 11.259, 24.382, 47.876, 64.492, 392.08,  C  2MARI
     1 489.95/                                                     C  3MARI
C
      COMMON/LMSB/N  ( 9)                                          N  1MARI
      REAL N                                                       N  2MARI
      DATA N/7., 14.0067, 14.532, 29.612, 47.438, 77.469, 97.886,  N  3MARI
     1 552.06, 666.99/                                             N  4MARI
C
      COMMON/LMSB/O  (10)                                          O  1MARI
      DATA O/8., 15.999, 13.618, 35.155, 54.947, 77.413, 113.9,    O  2MARI
     1 138.12, 739.3, 871.34/                                      O  3MARI
C
      COMMON/LMSB/F  (11)                                          F  1MARI
      DATA F/9., 18.9984, 17.42, 34.986, 62.66, 87.255, 114.24,    F  2MARI
     1 157.16, 185.18, 953.8, 1102./                               F  3MARI
C
      COMMON/LMSB/NE (12)                                          NE 1MARI
      REAL NE                                                      NE 2MARI
      DATA NE/10., 20.183, 21.564, 41.082, 63.76, 97.18, 126.4,    NE 3MARI
     1 157.91, 207.2, 239.1, 1195.6, 1360.4/                       NE 4MARI
```

```
C
      COMMON/LMSB/NA (13)
      REAL NA                                                           NA 1MARI
      DATA NA/11., 22.9898, 5.138, 47.29, 71.65, 98.88, 138.37,         NA 2MARI
     1 172.09, 208.444, 264.155, 299.78, 1464.8, 1646.1/                NA 3MARI
C                                                                       NA 4MARI
      COMMON/LMSB/MG (14)
      REAL MG                                                           MG 1MARI
      DATA MG/12., 24.312, 7.644, 15.031, 80.12, 109.29, 141.23,        MG 2MARI
     1 186.49, 224.9, 265.957, 327.9, 367.36, 1761.2, 1959./            MG 3MARI
C                                                                       MG 4MARI
      COMMON/LMSB/AL (15)
      DATA AL/13., 26.9815, 5.986, 18.828, 28.448, 119.98, 153.81,      AL 1MARI
     1 190.47, 241.99, 285.2, 330.22, 398.64, 441.96, 2085.5,           AL 2MARI
     2 2299./                                                           AL 3MARI
C                                                                       AL 4MARI
      COMMON/LMSB/SI (16)
      DATA SI/14., 28.086, 8.1509, 16.345, 33.467, 45.141, 166.76,      SI 1MARI
     1 205.16, 246.49, 303.93, 351.89, 401.37, 476.17, 523.39,          SI 2MARI
     2 2436., 2666./                                                    SI 3MARI
C                                                                       SI 4MARI
      COMMON/LMSB/P  (17)
      DATA P/15., 30.9738, 10.484, 19.72, 30.156, 51.354, 65.007,       P  1MARI
     1 220.414, 263.31, 309.26, 371.6, 424.3, 479.4, 560.3,             P  2MARI
     2 611.4, 2815., 3061./                                             P  3MARI
C                                                                       P  4MARI
      COMMON/LMSB/S  (18)
      DATA S/16., 32.064, 10.4, 23.41, 35.04, 47.292, 72.48,            S  1MARI
     1 88.03, 281., 328.82, 378.95, 447., 505.8, 566.,                  S  2MARI
     2 651., 706., 3220., 3482./                                        S  3MARI
C                                                                       S  4MARI
      COMMON/LMSB/CL (19)
      DATA CL/17., 35.453, 13.02, 23.804, 39.913, 53.455, 67.815,       CL 1MARI
     1 96.7, 114.3, 348.4, 400.85, 455.4, 530.9, 593.,                  CL 2MARI
     2 663., 749., 807., 3654., 3951./                                  CL 3MARI
C                                                                       CL 4MARI
      COMMON/LMSB/AR (20)
      DATA AR/18., 39.948, 15.759, 27.626, 40.891, 59.8, 75.02,         AR 1MARI
     1 91.32, 124., 143.49, 422.6, 479.4, 538.9, 621.,                  AR 2MARI
     2 687., 755., 854., 916., 4115., 4407./                            AR 3MARI
C                                                                       AR 4MARI
      COMMON/LMSB/K  (21)
      REAL K                                                            K  1MARI
      DATA K/19., 39.102, 4.339, 31.81, 46., 60.9, 82.6,                K  2MARI
     1 99.7, 118., 155., 175.94, 503.8, 564., 629.,                     K  3MARI
     2 717., 788., 870., 966., 1031., 4603., 4910./                     K  4MARI
C                                                                       K  5MARI
      COMMON/LMSB/CA (22)
      DATA CA/20.,40.08,6.111,11.868,51.21,67.,84.39,109.,128.,143.3,   CA 1MARI
     1188.,211.3,591.8,655.,727.,820.,896.,990.,1084.,1153.,5119.,5471./CA 2MARI
C                                                                       CA 3MARI
      COMMON/LMSB/SC (23)
      DATA SC/21., 44.956, 6.54, 12.8, 24.75, 73.9, 92.,                SC 1MARI
     1 111., 139., 159., 180., 226., 250., 687.,                        SC 2MARI
     2 758., 830., 930., 1010., 1115., 1210., 1282.,                    SC 3MARI
                                                                        SC 4MARI
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      3 5483.3, 6035.4/                                                  SC  5MARI
C
       COMMON/LMSB/TI (24)                                               TI  1MARI
       DATA TI/22., 47.9, 6.82, 13.57, 27.47, 43.24, 99.8,               TI  2MARI
      1        120., 141., 172.,  193.,  217.,  266., 2[illegible].,     TI  3MARI
      2        788., 864., 941., 1046., 1132., 1245., 1341.,             TI  4MARI
      3        1417.8, 6049.3, 6627./                                    TI  5MARI
C
       COMMON/LMSB/V (25)                                                V   1MARI
       DATA V/ 23., 50.942, 6.74, 14.65, 29.4, 48., 65., 129., 151.,     V   2MARI
      1174., 206., 230.5, 258., 309., 336., 897., 976., 1057., 1170.,    V   3MARI
      21200., 1380., 1480.5, 1560.3, 6645.8, 7248.4/                     V   4MARI
C
       COMMON/LMSB/CR (26)                                               CR  1MARI
       DATA CR/24., 51.996, 6.764, 16.49, 30.95, 50., 73.,               CR  2MARI
      1 91., 161., 185., 210., 249., 272., 299.,                         CR  3MARI
      2 355., 384., 1013., 1095., 1182., 1301., 1395.,                   CR  4MARI
      3 1525.2, 1626.3, 1709.7, 7266.7, 7897.4/                          CR  5MARI
C
       COMMON/LMSB/MN (27)                                               MN  1MARI
       REAL MN                                                           MN  2MARI
       DATA MN/25., 54.938, 7.433, 15.636, 33.69, 53., 76.,              MN  3MARI
      1 100., 119., 196., 222., 248., 288., 315.,                        MN  4MARI
      2 350., 404., 435., 1136., 1222., 1313., 1438.,                    MN  5MARI
      3 1538., 1678., 1779., 1866., 7918., 8575./                        MN  6MARI
C
       COMMON/LMSB/FE (28)                                               FE  1MARI
       DATA FE/26., 55.847, 7.87, 16.18, 30.643, 57., 79.,               FE  2MARI
      1 103., 130., 151., 235., 262., 290., 330.,                        FE  3MARI
      2 355., 390., 457., 469., 1200., 1354., 1450.,                     FE  4MARI
      3 1583., 1687., 1837., 1958., 2029., 8599., 9281./                 FE  5MARI
C
       COMMON/LMSB/CO (29)                                               CO  1MARI
       DATA CO/27.,58.9332,7.86,17.05,33.49,53.,83.,108.,134.,164.,190., CO  2MARI
      1290.,305.,337.,380.,412.,444.,512.,547.,1403.,1495.,6[illegible]0.,9307.7,  CO  3MARI
      210016./                                                           CO  4MARI
C
       COMMON/LMSB/NI (30)                                               NI  1MARI
       REAL NI                                                           NI  2MARI
       DATA NI/28.,58.71,7.633,18.15,35.16,56.,79.,112.,140.,169.,202.,  NI  3MARI
      1230.,321.,350.,385.,430.,455.,500.,530.,607.,1541.,7[illegible]0.,10046.,  NI  [illegible]MARI
      210780./                                                           NI  4MARI
C
       COMMON/LMSB/CU (31)                                               CU  1MARI
       DATA CU/29.,63.54, 7.724, 20.29, 36.83, 59., 82., 110., 140.,170.,CU  2MARI
      1206., 241., 265., 370., 400., 440., 480., 520., 560., 630., 671., CU  3MARI
      21694., 1796., 1905., 2057., 2175., 2360., 2458., 2559., 10813.,   CU  4MARI
      311573./                                                           CU  5MARI
C
       COMMON/LMSB/ZN (32)                                               ZN  1MARI
       DATA ZN/30.,65.37,9.391,17.96,39.7,62.,86.,115.,145.,180.,210.,   ZN  2MARI
      1250.,0.,311.,420.,450.,490.,540.,580.,620.,700.,9[illegible]0.,11610.,  ZN  3MARI
      212395./                                                           ZN  4MARI
C
       COMMON/LMSB/GA (33)                                               GA  1MARI
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      DATA GA/31., 69.72, 6., 20.511, 30.684, 64.18, 90.,              GA 2MARI
     1 118., 144., 174., 218., 255.,                                   GA 3MARI
     2 19*0., 12456., 13246./                                          GA 4MARI
C
      COMMON/LMSB/GE (34)                                              GE 1MARI
      DATA GE/32., 72.59, 7.885, 15.934, 34.223, 45.711, 93.447,       GE 2MARI
     1 115., 148., 177., 212., 262.,                                   GE 3MARI
     2 20*0., 13291., 14127./                                          GE 4MARI
C
      COMMON/LMSB/AS (35)                                              AS 1MARI
      DATA AS/33., 74.9216, 9.815, 20.209, 28.317, 50.134, 62.626,     AS 2MARI
     1 127.55, 150., 182., 218., 253.,                                 AS 3MARI
     2 21*0., 14176., 15037./                                          AS 4MARI
C
      COMMON/LMSB/SE (36)                                              SE 1MARI
      DATA SE/34.,78.96,9.75,21.5,32.,43.,68.,82.,155.,167.,223.,260., SE 2MARI
     122*0.,15092.,15977./                                             SE 3MARI
C
      COMMON/LMSB/BR (37)                                              BR 1MARI
      DATA BR/35., 79.909, 11.84, 21.6, 35.9, 47.3, 59.7,              BR 2MARI
     1 88.6, 103., 193., 228., 266.,                                   BR 3MARI
     2 23*0., 16037., 16947./                                          BR 4MARI
C
      COMMON/LMSB/KR (38)                                              KR 1MARI
      REAL KR                                                          KR 2MARI
      DATA KR/36., 83.8, 13.999, 24.571, 36.951, 52., 65.,             KR 3MARI
     1 79., 110., 126., 234., 270.,                                    KR 4MARI
     2 24*0., 17013., 17947./                                          KR 5MARI
C
      COMMON/LMSB/RB (39)                                              RB 1MARI
      DATA RB/37., 85.47, 4.176, 27.5, 40., 52., 71.,                  RB 2MARI
     1 85., 100., 135., 151., 277.,                                    RB 3MARI
     2 25*0., 18019., 18978./                                          RB 4MARI
C
      COMMON/LMSB/SR (40)                                              SR 1MARI
      DATA SR/38., 87.62, 5.692, 11.027, 43., 57., 72.,                SR 2MARI
     1 92., 107., 124., 162., 179., 324.,                              SR 3MARI
     2 25*0., 19055., 20038./                                          SR 4MARI
C
      COMMON/LMSB/Y (41)                                               Y  1MARI
      DATA Y/39., 88.905, 6.38, 12.23, 20.5, 62., 77.,                 Y  2MARI
     1 93., 116., 131., 148., 191., 206.,                              Y  3MARI
     2 26*0., 20123., 21130./                                          Y  4MARI
C
      COMMON/LMSB/ZR (42)                                              ZR 1MARI
      DATA ZR/40.,91.22,6.84,13.13,22.98,34.33,82.,99.,117.,141.,157., ZR 2MARI
     1176.,222.,27*0.,21221.,22252./                                   ZR 3MARI
C
      COMMON/LMSB/NB (43)                                              NB 1MARI
      REAL NB                                                          NB 2MARI
      DATA NB/41., 92.906, 6.88, 14.32, 25.04, 38.3, 50.,              NB 3MARI
     1 103., 125., 143., 167., 185., 203.,                             NB 4MARI
     2 28*0., 22351., 23406./                                          NB 5MARI
C
      COMMON/LMSB/MO (44)                                              MO 1MARI
```

```
      REAL MO                                                           MO 2MARI
      DATA MO/42., 95.94, 7.1, 16.15, 27.13, 46.4, 61.2,                MO 3MARI
     1 68., 126., 153., 169., 197., 210.,                               MO 4MARI
     2 29*0., 23513., 24590./                                           MO 5MARI
C
      COMMON/LMSB/TC (45)                                               TC 1MARI
      DATA TC/43.,99.,7.28,15.26,31.,43.,59.,76.,94.,161.,183.,199.,    TC 2MARI
     1224.,30*0.,24706.,25807./                                         TC 3MARI
C
      COMMON/LMSB/RU (46)                                               RU 1MARI
      DATA RU/44.,101.07,7.364,16.76,28.46,46.,63.,81.,100.,119.,193.,  RU 2MARI
     1216.,225.,31*0.,25931.,27056./                                    RU 3MARI
C
      COMMON/LMSB/RH (47)                                               RH 1MARI
      DATA RH/45., 102.905, 7.46, 18.07, 31.05, 46., 67.,               RH 2MARI
     1 85., 105., 126., 147., 226., 250.,                               RH 3MARI
     2 32*0., 27189., 28336./                                           RH 4MARI
C
      COMMON/LMSB/PD (48)                                               PD 1MARI
      DATA PD/46.,106.4,8.33,19.42,32.92,49.,66.,90.,110.,132.,155.,    PD 2MARI
     1178.,261.,33*0.,28478.,29648./                                    PD 3MARI
C
      COMMON/LMSB/AG (49)                                               AG 1MARI
      DATA AG/47., 107.87, 7.574, 21.48, 34.82, 52., 70.,               AG 2MARI
     1 89., 116., 139., 162., 187.,                                     AG 3MARI
     2 35*0., 29801., 30993./                                           AG 4MARI
C
      COMMON/LMSB/CD (50)                                               CD 1MARI
      DATA CD/48., 112.4, 8.991, 16.92, 38.2, 55., 73.,                 CD 2MARI
     1 94., 115., 146., 170., 195.,                                     CD 3MARI
     2 36*0., 31156., 32371./                                           CD 4MARI
C
      COMMON/LMSB/IN (51)                                               IN 1MARI
      REAL IN                                                           IN 2MARI
      DATA IN/49., 114.82, 5.786, 18.869, 28.029, 54.41, 77.,           IN 3MARI
     1 98., 120., 144., 178., 204.,                                     IN 4MARI
     2 37*0., 32545., 33782./                                           IN 5MARI
C
      COMMON/LMSB/SN (52)                                               SN 1MARI
      DATA SN/50., 118.69, 7.344, 14.632, 30.524, 40.735, 72.273,       SN 2MARI
     1 103., 126., 150., 176., 213.,                                    SN 3MARI
     2 38*0., 33968., 35227./                                           SN 4MARI
C
      COMMON/LMSB/SB (53)                                               SB 1MARI
      DATA SB/51., 121.75, 8.641, 16.53, 25.32, 44.156, 55.7,           SB 2MARI
     1 107.6, 132., 157., 184., 211.,                                   SB 3MARI
     2 39*0., 35425., 36705./                                           SB 4MARI
C
      COMMON/LMSB/TE (54)                                               TE 1MARI
      DATA TE/52., 127.6, 9.01, 18.6, 30.6, 37.81, 60.27,               TE 2MARI
     1 72.33, 137.2, 164., 192., 220.,                                  TE 3MARI
     2 40*0., 36916., 38217./                                           TE 4MARI
C
      COMMON/LMSB/I (55)                                                I  1MARI
      REAL I                                                            I  2MARI
```

```
      DATA I/53., 126.9044, 10.456, 19.099, 32., 42., 66.,               I   3MARI
     1 81., 99., 170., 200., 229.,                                         I   4MARI
     2 41*0., 38441., 39764./                                              I   5MARI
C
      COMMON/LMSB/XE (56)                                                  XE 1MARI
      DATA XE/54., 131.3, 12.129, 21.21, 32.12, 38.3, 51.5,                XE 2MARI
     1 64.2, 91.4, 106.6, 175.2, 196.2, 218.6, 242.3,                      XE 3MARI
     2 267.4, 293.6, 323.6, 352.6, 382.7, 414., 443.6,                     XE 4MARI
     3 563.8, 599.2, 635.9, 690.8, 730., 753., 864.,                       XE 5MARI
     4 1521., 1582., 1642., 1712., 1782., 1854., 1945.,                    XE 6MARI
     5 2025., 2106., 2461., 2471., 2559., 2649., 2742.,                    XE 7MARI
     6 2919., 3022., 3224., 3330., 7632., 7822., 8020.,                    XE 8MARI
     7 8234., 8821., 9082., 9528., 9802., 40260., 41430./                  XE 9MARI
C
      COMMON/LMSB/CS (57)                                                  CS 1MARI
      DATA CS/55., 132.905, 3.893, 25.1, 35., 46., 62.,                    CS 2MARI
     1 74., 101., 120., 144., 253.,                                        CS 3MARI
     2 43*0., 41597., 42962./                                              CS 4MARI
C
      COMMON/LMSB/BA (58)                                                  BA 1MARI
      DATA BA/56., 137.34, 5.21, 10.001, 36., 49., 62.,                    BA 2MARI
     1 80., 93., 120., 143., 157.,                                         BA 3MARI
     2 44*0., 43229., 44613./                                              BA 4MARI
C
      COMMON/LMSB/LA (59)                                                  LA 1MARI
      REAL LA                                                              LA 2MARI
      DATA LA/57., 138.91, 5.61, 11.43, 19.17, 52., 66.,                   LA 3MARI
     1 80., 100., 114., 144., 165., 204.,                                  LA 4MARI
     2 44*0., 44897., 46301./                                              LA 5MARI
C
      COMMON/LMSB/CE (60)                                                  CE 1MARI
      DATA CE/58., 140.12, 5.6, 12.3, 20., 35., 70.,                       CE 2MARI
     1 85., 100., 122., 137., 165., 189.,                                  CE 3MARI
     2 45*0., 46601., 48025./                                              CE 4MARI
C
      COMMON/LMSB/PR (61)                                                  PR 1MARI
      DATA PR/59., 140.907, 5.48, 0., 23.2, 2*0.,                          PR 2MARI
     1 89., 106., 122., 146., 162., 197.,                                  PR 3MARI
     2 46*0., 48342., 49785./                                              PR 4MARI
C
      COMMON/LMSB/ND (62)                                                  ND 1MARI
      REAL ND                                                              ND 2MARI
      DATA ND/60., 144.24, 5.5, 4*0.,                                      ND 3MARI
     1 1*0., 110., 128., 147., 171.,                                       ND 4MARI
     2 48*0., 50120., 51582./                                              ND 5MARI
C
      COMMON/LMSB/PM (63)                                                  PM 1MARI
      DATA PM/61.,147.,7*0.,135.,154.,173.,49*0.,51936.,53417./            PM 2MARI
C
      COMMON/LMSB/SM (64)                                                  SM 1MARI
      DATA SM/62., 150.35, 5.6, 11.3,                                      SM 2MARI
     1 58*0., 53790., 55290./                                              SM 3MARI
C
      COMMON/LMSB/EU (65)                                                  EU 1MARI
      DATA EU/63.,151.96,5.67,11.2,7*0.,187.,51*0.,55683.,57201./          EU 2MARI
```

```
C
      COMMON/LMSB/GD (66)                                               GD 1MARI
      DATA GD/64.,157.25,6.16,12.,60*0.,57615.,59151./                  GD 2MARI
C
      COMMON/LMSB/TB (67)                                               TB 1MARI
      DATA TB/65., 158.924, 5.98,                                       TB 2MARI
     1 62*0., 59587., 61140./                                           TB 3MARI
C
      COMMON/LMSB/DY (68)                                               DY 1MARI
      DATA DY/66., 162.5, 6.8,  63*0.,  61599., 63169./                 DY 2MARI
C
      COMMON/LMSB/HO (69)                                               HO 1MARI
      DATA HO/67., 164.93, 6.,                                          HO 2MARI
     1 64*0., 63652., 65239./                                           HO 3MARI
C
      COMMON/LMSB/ER (70)                                               ER 1MARI
      DATA ER/68., 167.26, 6.08,                                        ER 2MARI
     1 65*0., 65746., 67350./                                           ER 3MARI
C
      COMMON/LMSB/TM (71)                                               TM 1MARI
      DATA TM/69., 168.934, 6.,                                         TM 2MARI
     1 66*0., 67882., 69502./                                           TM 3MARI
C
      COMMON/LMSB/YB (72)                                               YB 1MARI
      DATA YB/70.,173.04,6.2,12.1,66*0.,70062.,71696./                  YB 2MARI
C
      COMMON/LMSB/LU (73)                                               LU 1MARI
      REAL LU                                                           LU 2MARI
      DATA LU/71., 174.97, 6.1, 15., 19.,                               LU 3MARI
     1 66*0., 72284., 73933./                                           LU 4MARI
C
      COMMON/LMSB/HF (74)                                               HF 1MARI
      DATA HF/72., 178.49, 7., 14.9, 23.3, 33.1,                        HF 2MARI
     1 66*0., 74550., 76214./                                           HF 3MARI
C
      COMMON/LMSB/TA (75)                                               TA 1MARI
      DATA TA/73., 180.948, 7.88, 16.2, 22., 33., 45.,                  TA 2MARI
     1 66*0., 76860., 78559./                                           TA 3MARI
C
      COMMON/LMSB/W  (76)                                               W  1MARI
      DATA W/74.,183.85,7.98,17.7,24.,35.,48.,61.,114.3,131.2,149.1,    W  2MARI
     1168.,200.,222.,276.,300.,309.,338.,369.,401.,434.,468.,504.,541., W  3MARI
     2583.,625.,664.,706.,750.,796.,1045.,1093.,1142.,1192.,1244.,1297.,W  4MARI
     31367.,1423.,1481.,1539.,1758.,1818.,1880.,1942.,2101.,2168.,2333.,W  5MARI
     42402.,4032.,4133.,4238.,4346.,4457.,4575.,4767.,4891.,5020.,5459.,W  6MARI
     55590.,5722.,5857.,5996.,6498.,6651.,6970.,7124.,15545.,15816.,    W  7MARI
     616109.,16426.,18209.,18597.,19275.,19680.,79377.,81009./          W  8MARI
C
      COMMON/LMSB/RE (77)                                               RE 1MARI
      DATA RE/75., 186.2, 7.87, 16.6, 26., 38., 51.,                    RE 2MARI
     1 64., 79.,                                                        RE 3MARI
     2 66*0., 81618., 83325./                                           RE 4MARI
C
      COMMON/LMSB/OS (78)                                               OS 1MARI
      DATA OS/76.,190.2,8.7,17.,25.,40.,54.,68.,83.,99.,66*0.,84067.,   OS 2MARI
```

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      DATA RA/88.,226.05,5.277,10.144,34.,46.,58.,76.,89.,103.,140.,    RA  2MARI
     1156.,76*0.,117449.,119287./                                        RA  3MARI
C
      COMMON/LMSB/AC (91)                                                AC  1MARI
      DATA AC/89.,227.,6.9,12.1,20.,49.,62.,76.,95.,109.,123.,164.,      AC  2MARI
     177*0.,120600.,122442./                                             AC  3MARI
C
      COMMON/LMSB/TH (92)                                                TH  1MARI
      DATA TH/90., 232.038, 6.95, 12., 20., 29.2, 65.,                   TH  2MARI
     1 80., 94., 115., 130., 145.,                                       TH  3MARI
     2 78*0., 123809., 125658./                                          TH  4MARI
C
      COMMON/LMSB/PA (93)                                                PA  1MARI
      DATA PA/91., 231., 5*0., 84., 100., 115., 138., 154.,              PA  2MARI
     1 79*0., 127084., 128938./                                          PA  3MARI
C
      COMMON/LMSB/U  (94)                                                U   1MARI
      DATA U/92., 238.04, 6.12, 11.45, 17.92, 31.12, 47.33, 62.83, 92.7,U   2MARI
     1105.7   ,119.1   ,149.   ,162.7 ,178.4  ,221.8,241. ,339.3 ,363.4,U   3MARI
     2388.2,414.,440.5,466.,508.,537.5,568.,599.,733.2,766.3,801.,835., U   4MARI
     3948.,986.,1091.,1131.,1354.,1404.,1455.,1508.,1562.,1618.,1675.,  U   5MARI
     41733., 1808., 1869., 1932., 1997., 2062.,2130.,2513.,2581., 2651.,U   6MARI
     52721.,2795.,2869.,3003.,3081.,3160.,3242.,3555.,3637.,3720.,3804.,U   7MARI
     64209.,4300.,4536.,4629.,7428.,7562.,7701.,7844.,7991.,8146.,8512.,U   8MARI
     78675.,8843.,9016.,9593.,9764.,9938.,10120.,11370.,11570.,12000.,  U   9MARI
     812220.,25330.,25670.,26040.,26440.,30960.,31460.,32390.,32920.,   U  10MARI
     9130400.,132500./                                                  U  11MARI
C
      COMMON/LMSB/ENDWRD(2)
      DATA ENDWRD/0.,854./
C
      RETURN
      END
```

The way in which the MARI deck is used by the EIONX program and other equation-of-state subroutines requires that, if any given ionization potential is unknown, it and all higher ionization potentials must be replaced by zeros. The MARIE block data program is not held to this restriction and has zeros replacing only the unknown ionization potentials (and not any higher ones that may be known). However, it must have the elements entered in the order of increasing atomic number. The MARI block data program is ordered in the same fashion, but this is merely for reading ease and is not a requirement on the MARI program.

The potentials used in MARIE are taken from HELAS, which follows, and Allen (Ref. 5), Garstang (Ref. 6), Moore (Ref. 7), NBS tables (Ref. 8), Stewart and Rotenberg (Ref. 9), and Lotz (Ref. 10).

MARIE is a FORTRAN IV block data program used by many other programs as a source of the atomic weights and the ionization potentials of the elements. It is organized in the same fashion as the MARI block data program, namely:

1. For each element, in sequence as listed below:
   a. The atomic number
   b. The atomic weight
   c. The ionization potentials

For any given element, those ionization potentials that are not known are entered as zero.

2. The MARIE deck has the elements entered in the order of increasing atomic number.

HELIKE: THE HELIUM ISOELECTRONIC SEQUENCE

HELIKE is one of two programs used to generate the ionization potentials of the helium sequence. (HELAS is the other program; refer to the HELAS writeup.) HELIKE is based on the development of Bethe and Salpeter.

1. $V^{Z}_{Z-1} = J_{NR} + E_{j} + \Delta E_{j}$ in Rydbergs

2. $J_{NR} = Z^2 - \frac{5}{4}Z + 0.315311 - 0.01707/Z + 0.00068/Z^2 +$

$0.00164/Z^3 + 0.00489/Z^4$

3. $E_j = \frac{1}{4}\alpha^2 Z^2 \{Z^2 - 3.606Z + 3.29 + 0.05/Z\}$

4. $\Delta E_j = \frac{-16Z^4\alpha^3}{3\pi} \{3.745 - \ell n\, Z - \left(\frac{1}{Z}\right)(5.97 - 1.31\, \ell nZ) +$

$(3.08 - 0.28\, \ell nZ)/Z^2\}$

5. $\alpha \equiv 1./137.037$

where V^{Z}_{Z-1} is the (Z-1)-st ionization potential of the element with atomic number Z.

The helium-sequence ionization potentials generated by the above equation appear to diverge from measured values for $Z > 17$. For this reason, the technique used in the HELAS program was next coded. A comparison tabulation follows the HELAS writeup.

HELAS: THE HELIUM ISOELECTRONIC SEQUENCE

HELAS is the second program used to generate the ionization potentials of the helium sequence (refer to the HELIKE writeup). HELAS is based on the paper by Brenner and Brown (Ref. 11).

The relativistic Dirac equation for the energy of a one-electron atom can be written:

$$E_{DIRAC} = -2(\beta_Z - 1)\alpha^2 \quad \text{in Rydbergs}$$

where

$$\beta_Z = [1 - (\alpha Z)^2]^{1/2} \quad \text{and } \alpha \equiv (1./137.037)$$

The two-electron-interaction energy can be expressed as

$$\gamma_Z = 2\,[\beta_Z\,(2\beta_Z - 1)]^{-1}\,[-1 + 10\beta_Z - 2(\beta_Z)^2 - 4(\beta_Z)^3]$$

$$- 2\left[\frac{2}{(3)(2\beta_Z + 1)\Gamma(2\beta_Z + 1)}\right]\left[\frac{\Gamma(2\beta_Z + 1)(1 + 18\beta_Z - 2(\beta_Z)^2 - 12(\beta_Z)^3)}{2\pi^{1/2}\beta_Z}\right]$$

Then, the helium-sequence ionization potential is given by:

$$\phi^Z_{Z-1} = E_{DIRAC} - \gamma_Z \quad \text{in Rydbergs}$$

It proved necessary to normalize this equation to the value of V^{He}_1 by using

$$X^Z_{Z-1} = \phi^Z_{Z-1} - (\phi^2_1 - V^2_1) \quad \text{in Rydbergs}$$

where V^2_1 is the (measured) first ionization potential of helium and $(\phi^2_1 - V^2_1)$ is thus an additive constant. The set of X^Z_{Z-1}; $2 \leq Z \leq 92$ form the final program output. These values are tabulated together with the HELIKE values in table IV.

```
      PROGRAM HELIKE(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
C
C     REFERENCE
C              BETHE AND SALPETER
C              QUANTUM MECHANICS OF ONE AND TWO ELECTRON SYSTEMS.
C              EQUATIONS (33.12), (41.11A), AND (41.12A)
C
C
      DIMENSION V CM(100), V EV(100), JNR(100), EJ(100), DEL EJ(100)
      REAL JNR
      DATA PI/3.14159265/, RY CM/109737.31/, RY EV/13.6048/, ALF MI/137.
     1       037/
C
      COMMON/LMSB/A(1)
C
      ALFA= 1./ALF MI
      ALFASQ=  ALFA * ALFA
C
C
C
      DO 1 I=2,100
      Z=I
      ZLN=ALOG(Z)
      ZSQ=Z*Z
      Z4TH= ZSQ*ZSQ
C
C     NON-RELATIVISTIC CONTRIBUTION
      JNR(I)= ZSQ -1.25*Z +.315311 -1.707E-2/Z +6.8E-4/ZSQ +1.64E-3/Z
     1        /ZSQ  + 4.89E-3/Z4TH
C
C     RELATIVISTIC CONTRIBUTION
      EJ(I)= .25 * ALFASQ *ZSQ * (ZSQ-3.606*ZLN +3.29 + .05/Z )
      DEL EJ(I)= -16. * Z4TH *ALFASQ *ALFA/3./PI * (3.747-ZLN-(5.97-1.3
     1            1*ZLN)/Z  +(3.08-.28*ZLN)/ZSQ  )
C
      K=5
C
      RYA CM= RY CM-60.22/A(K)
      RYA EV= RYA CM * 1.239/7E-4
      K=K+2+IFIX(A(K-1))
C
      SUM= JNR(I)+EJ(I)+DEL EJ(I)
      V CM(I)= RYA CM * SUM
      V EV(I)= RYA EV * SUM
    1 CONTINUE
C
C
      WRITE(6,2)
    2 FORMAT(1H1)
      WRITE(6,3)
    3 FORMAT(53H THE 2 ELECTRON GROUND STATE IONIZATION POTENTIAL IS )
      WRITE(6,4) ( I,V EV(I),V CM(I), JNR(I),EJ(I),DEL EJ(I),I=2,100)
    4 FORMAT(1X, 7HFOR Z= ,I3, 9H,  N E.V.,1PE13.6,13H (OR,IN /CM, ,E13.
     16, 6H ), = ,E13.6, 7H JNR + ,E13.6, 6H EJ + , E13.6, 7H DEL EJ )
      CALL EXIT
      CALL MARIE
      RETURN
      END
```

```
      PROGRAM  HELAS(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
C
C     REFERENCE
C
C     S.BRENNER AND G.E. BROWN
C     PROC. ROY. SOC. LONDON, SERIES A, VOL.218, P.422-432
C          (1953)
C
C
C
C
      DIMENSION BETA(100), EDIRAC(100), BRACES(100),E TO E(100),ETOEV(10
     10),ETOT(100),ETOTEV(100),ETOT2(100), EVTOT2(100),EDRCEV(100)
C
      DATA ALF M1/137.037/,RY/13.6048/,SQRTPI/1.7724539   /,HE RY/1.8071
     1       /, HE EV/24.585/
C
      ALFA= 1./ALFM1
      ALFSQ= ALFA*ALFA
C
C
C
      DO 1 I=2,100
      Z=I
      ZSQ= Z*Z
      BETA(I)=SQRT(1.-ALFSQ * ZSQ)
      X=BETA(I)
      EDIRAC(I)=-2.*(X-1.)/ALFSQ
      EDRCEV(I)=EDIRAC(I)*RY
      CALL GAMMA(2.*X+1.,GAM1,S2,S3)
    2 CALL GAMMA(2.*X+.5,GAMHAF,S4,S3)
      GO TO 4
    3 CALL MERR
    4 CONTINUE
      Y= 2.*X-1.
      BRACES(I)=  (-1.+X* (10. - X* (2.+4.*X)))/X/Y/3.
     1  -2./GAM1/3./Y  *   GAMHAF * (-1.+ X*(18.-X* (2.+ 12.*X)))/
     2  SQRTPI/2. /X
      E TO E(I)=  2.* Z *  BRACES(I)
      ETOEV(I)=  E TO E(I)  *RY
      ETOT(I)= EDIRAC(I)-E TO E(I)
      ETOTEV(I)=EDRCEV(I)-ETOEV(I)
      IF (I.GT.2) GO TO 5
      HELOT= HE RY-ETOT(2)
      HELEV= HE EV-ETOTEV(2)
    5 CONTINUE
      ETOT2(I)= ETOT(I) + HELOT
      EVTOT2(I) = ETOTEV(I)+HELEV
    1 CONTINUE
```

```
C
C
C
      WRITE(6,7)
    7 FORMAT(1H1)
      WRITE(6,8) HELOT, HELEV
    8 FORMAT(1X,14HUSING HELOT = ,1PE15.8,2X, 12HAND HELEV = ,1PE15.8,
     112H WE COMPUTE //1X,3H  Z,  5X,7HBETA(Z),4X,9HEDIRAC(Z),3X,9HEDRCE
     2V(Z),3X,9HBRACES(Z),3X,9HE TO E(Z),2X,10HE TO EV(Z),4X,8HE TOT(Z),
     33X,9HETOTEV(Z),3X,9HE TOT2(Z),3X, 9HEVTOT2(Z))
      WRITE(6,9) (I,BETA(I),EDIRAC(I),EDRCEV(I),BRACES(I),ETOE(I),
     1 ETOEV(I),ETOT(I),ETOTEV(I),ETOT2(I),EVTOT2(I), I=2,100)
    9 FORMAT (1X,I3,1PE12.6,1X,9E12.6)
      CALL EXIT
C
      END
         IF(KMARI .EQ. KK) GO TO  107
         IF (KMARI ,EQ. 0) GO TO 103
C     THE ABOVE OCCURS WHENEVER THE KK-TH ELEMENT IS NOT IN THE MARI
C       DECK
  106 CONTINUE
      M=M+ KMARI+ 2
      GO TO 105
  107 CONTINUE
C     AT THIS POINT THE KK-TH ELEMENT HAS BEEN LOCATED
C     ITS LOWER-TH IONIZATION POTENTIAL WILL BE USED
C
C     TEST LOWER-TH IONIZATION POTENTIAL. IF ZERO, SKIP TO NEXT ELEMENT.
      IF (KMARI.LT.LOWRZ) GO TO 103
C
      INDEX=M+1+ LOWER
         IF(ABS(U(INDEX)).LT. 1.E-8 ) GO TO 103
C     WE NOW HAVE A VALID DATUM AND CAN ENTER IT INTO THE Y ARRAY.
      LSTORE=       LSTORE+1
      X(LSTORE)=    LOWER+LSTEP
      Y(LSTORE)=    U(INDEX)
         IF (LREDUC.NE.0) Y(LSTORE)=Y(LSTORE)/X(LSTORE)
      MATNO(LSTORE)= KK
  103 CONTINUE
C     AT THIS POINT, THE X AND Y ARRAYS HAVE BEEN SET UP.
C     THERE ARE LSTORE ENTRIES IN THESE ARRAYS
C
C
C
      CALL FIT (X, Y, LSTORE, LORDER, DEVEAT, IM, COE)
      IF (IM) 201,202,201
  201 CONTINUE
      WRITE(6,7703)LSTORE,LORDER,LOWER,(Y(J),MATNO(J),J=1,LSTORE)
      CALL DEBUG(201,202,NEXT)
      GO TO 500
  202 CONTINUE
      ILORDR=LORDER+1
      DO 203 J=1,ILORDR
      COEF( J, K  ) = COE(J)
  203 CONTINUE
```

```
      LAST=LOWER+8
C
C     EVALUATE SEQUENCE FROM POLYNOMIAL
      DO 204 J=1,LOWER
      XJ=J
      KATNO(J)= K-1+J
      POTENL(J)=COE(1)
      DO 91 I=2,ILORDR
      POTENL(J)=POTENL(J)+COE(I)*(XJ**(I-1))
   91 CONTINUE
      KKATNO = KATNO(J)
      MARIAN(KKATNO,J) = POTENL(J)
  204 CONTINUE
C
      NUXT=LOWER+1
C
      WRITE(6,7703)LSTORE,LORDER,LOWER,(Y(J),MATNO(J), J=1,LSTORE)
 7703 FORMAT(6H1USING,I3,23H IONIZATION POTENTIALS,3X,15HA FIT OF ORDER
     1,I2,6H TO THE ,I3,26H-TH ISOELECTRONIC SEQUENCE/3X,4HWITH,3X,
     212HINPUT VALUE    ,18H AT ATOMIC NUMBER /(10X,1PE10.4,14X,I3))
C
      WRITE(6,7002) (KATNO(J), J, POTENL(J), J=1,LOWER )
 7002 FORMAT(21H0HAS A FIT EVALUATION/3(8H FOR Z =,I3,6H AT J=,I3,11H,A
     1VALUE OF, 0PF9.1,3X))
C
 7704 FORMAT(29H FURTHER EVALUATED VALUES ARE /(3X,4H Z =,I3,3X,4H J =,
     1  I3,1PE15.8))
C
      WRITE(6,7705)  COE
 7705 FORMAT(21H USING THE POLYNOMIAL ,5X,1PE14.8,6H  +J* ,1PE14.8,
     1 7H  +J*J* ,1PE14.8,10H  +J**3 * ,1PE14.8,10H  +J**4 * ,1PE14.8)
C
 7707 FORMAT(21H USING THE POLYNOMIAL ,5X,1PE14.8,6H  +J* ,1PE14.8,
     1 7H  +J*J* ,1PE14.8)
C
      WRITE(6,7003) DEVEAT
 7003 FORMAT(28H THE STANDARD DEVIATION WAS , 1PE12.5 )
C
C
C     MORE=0 FIT Z=93 TO 100 WITH INPUT IF AVAILABLE,OUTPUT IF NOT
C     MORE=1  FIT Z=93 TO 100 WITH INPUT ONLY
C     MORE=2  FIT Z=93 TO 100 WITH OUTPUT ONLY
      IF (MORE .EQ. 1) GO TO 301
C     PATH FOR MORE.EQ.2.OR.MORE.EQ.0
      XX(3)=LOWER
      YY(3)=POTENL(LOWER)
      XX(2)=LOWER-1
      YY(2)=POTENL(LOWER-1)
      XX(1)=LOWER-2
      YY(1)=POTENL(LOWER-2)
      IF(MORE.NE.0) GO TO 302
      IF (MATNO(LSTORE) .EQ. KATNO(LOWER)) YY(3)=Y(LSTORE)
      IF (MATNO(LSTORE-1) .EQ. KATNO(LOWER-1)) YY(2)=Y(LSTORE-1)
      IF (MATNO(LSTORE-2) .EQ. KATNO(LOWER-2))  YY(1)=Y(LSTORE-2)
  302 CONTINUE
```

```
      WRITE (6,7110)
 7110 FORMAT (30H0INPUT TO THE QUADRATIC FIT IS /)
      DO 401 LY=1,3
      LYY=LOWER-3+LY
      LYYY=XX(LY)
      WRITE(6,7109) KATNO(LYY),LYYY,YY(LY)
 7109 FORMAT (5X,18H AT ATOMIC NUMBER ,I3,10H WITH J  = ,I3,
     128H AN IONIZATION POTENTIAL OF ,1PE15.8)
  401 CONTINUE
      GO TO 303
  301 CONTINUE
C     PATH FOR MORE = 1
      XX(1)=X(LSTORE-2)
      XX(2)=X(LSTORE-1)
      XX(3)=X(LSTORE)
      YY(1)=Y(LSTORE-2)
      YY(2)=Y(LSTORE-1)
      YY(3)=Y(LSTORE)
      DO 108 LX=1,3
      LXX=LSTORE-3+LX
      LXXX=XX(LX)
      WRITE (6,7109) MATNO(LXX),LXXX,YY(LX)
  108 CONTINUE
  303 CONTINUE
      CALL FIT (XX,YY,L3,L2,DEVIAT,IM2,COE2)
      IF (IM2) 2001,2002,2001
 2001 CONTINUE
      WRITE (6,7703) L3,L2,(YY(J),MATNO(J),J=1,3)
      CALL DEBUG(2001,2002,NEXT)
      GO TO 500
 2002 CONTINUE
      DO 2003 J=6,8
      COEF(J,K)=COE2(J-5)
 2003 CONTINUE
C
C
      DO 2004 J=NUXT,LAST
      XJ=J
      KATNO(J)=K-1+J
      POTENL(J)=COE2(1)+COE2(2)*XJ+XJ*XJ*COE2(3)
      KKATNO=KATNO(J)
      MARIAN(KKATNO,J)=POTENL(J)
 2004 CONTINUE
      WRITE(6,7704) (KATNO(J), J, POTENL(J), J=NUXT,LAST)
      WRITE (6,7707) COE2
      WRITE (6,7003) DEVIAT
C
C
  500 CONTINUE
      WRITE (6,7006)
 7006 FORMAT (1H1)
C
C
      DO 600 J=1,100
      WRITE(6,7007)J
```

```
 7007 FORMAT (20H0FOR ELEMENT NUMBER ,I3, 31H, THE IONIZATION POTENTIALS
     1 ARE)
C
C
      DO 601 J2=1,J    ,10
      J4=  MIN0(J2+9,J    )
      WRITE (6,7005)      J2,(MARIAN(J,J3), J3=J2,J4)
 7005 FORMAT ( 1X,I3,3X,1P10E12.5)
C
  601 CONTINUE
  600 CONTINUE
C
      JLORDR=ILORDR+3
      WRITE(6,7706)    (  J,(COEF(JJ,J),JJ=1,JLORDR  ),J=1,KCOUNT)
 7706 FORMAT (14H1COEF ARRAY IS/(4X,I3,1P5E15.8,3X,1P3E15.8))
      GO TO 1
C
      CALL MARIE
      RETURN
      END
```

TABLE IV

IONIZATION POTENTIALS FOR THE TWO-ELECTRON ATOM

Z	(Ref. 5)	HELAS	HELIKE	Z	HELAS	HELIKE
2	2.4581+01	2.458500+01	2.459021+01	51	3.574248+04	3.575074+04
3	7.5619+01	7.559767+01	7.564295+01	52	3.723141+04	3.723577+04
4	1.5385+02	1.538334+02	1.539037+02	53	3.875441+04	3.875410+04
5	2.59298+02	2.592956+02	2.593939+02	54	4.031182+04	4.030598+04
6	3.91986+02	3.920030+02	3.921350+02	55	4.190398+04	4.189166+04
7	5.51925+02	5.519665+02	5.521509+02	56	4.353126+04	4.351138+04
8	7.39114+02	7.392276+02	7.394696+02	57	4.519402+04	4.516541+04
9	9.536+02	9.537974+02	9.541228+02	58	4.689264+04	4.685401+04
10	1.1956+03	1.195717+03	1.196147+03	59	4.862751+04	4.857744+04
11	1.4648+03	1.465021+03	1.465582+03	60	5.039905+04	5.033598+04
12	1.7612+03	1.761765+03	1.762473+03	61	5.220768+04	5.212990+04
13	2.0855+03	2.085968+03	2.086870+03	62	5.405386+04	5.395948+04
14	2.436+03	2.437710+03	2.438826+03	63	5.593802+04	5.582502+04
15	2.815+03	2.817031+03	2.818401+03	64	5.786065+04	5.772679+04
16	3.22+03	3.223997+03	3.225656+03	65	5.982224+04	5.966511+04
17	3.654+03	3.658670+03	3.660660+03	66	6.182331+04	6.164026+04
18	4.115+03	4.121115+03	4.123485+03	67	6.386439+04	6.365256+04
19	4.603+03	4.611420+03	4.614207+03	68	6.594602+04	6.570232+04
20	5.119+03	5.129647+03	5.132907+03	69	6.806879+04	6.778985+04
21		5.675899+03	5.679673+03	70	7.023330+04	6.991547+04
22		6.250255+03	6.254594+03	71	7.244014+04	7.207951+04
23		6.852810+03	6.857765+03	72	7.469000+04	7.428230+04
24		7.483672+03	7.489287+03	73	7.698353+04	7.652417+04
25		8.142944+03	8.149263+03	74	7.932141+04	7.880546+04
26		8.830720+03	8.837804+03	75	8.170441+04	8.112653+04
27		9.547140+03	9.555024+03	76	8.413326+04	8.348771+04
28		1.029231+04	1.030104+04	77	8.660876+04	8.588937+04
29		1.106637+04	1.107598+04	78	8.913176+04	8.833187+04
30		1.186944+04	1.187996+04	79	9.170308+04	9.081556+04
31		1.270166+04	1.271312+04	80	9.432365+04	9.334082+04
32		1.356319+04	1.357561+04	81	9.699440+04	9.590803+04
33		1.445417+04	1.446755+04	82	9.971633+04	9.851756+04
34		1.537476+04	1.538910+04	83	1.024905+05	1.011698+05
35		1.632512+04	1.634041+04	84	1.053179+05	1.038651+05
36		1.730543+04	1.732163+04	85	1.081997+05	1.066040+05
37		1.831586+04	1.833293+04	86	1.111371+05	1.093867+05
38		1.935660+04	1.937448+04	87	1.141314+05	1.122137+05
39		2.042784+04	2.044643+04	88	1.171838+05	1.150854+05
40		2.152978+04	2.154898+04	89	1.202957+05	1.180022+05
41		2.266262+04	2.268229+04	90	1.234686+05	1.209646+05
42		2.382660+04	2.384855+04	91	1.267040+05	1.239730+05
43		2.502191+04	2.504196+04	92	1.300036+05	1.270277+05
44		2.624880+04	2.626871+04	93	1.333689+05	1.301293+05
45		2.750751+04	2.752699+04	94	1.368018+05	1.332781+05
46		2.879828+04	2.881702+04	95	1.403042+05	1.364746+05
47		3.012137+04	3.013899+04	96	1.438782+05	1.397193+05
48		3.147706+04	3.149313+04	97	1.475258+05	1.430126+05
49		3.286562+04	3.287965+04	98	1.512492+05	1.463550+05
50		3.428732+04	3.429878+04	99	1.550511+05	1.497469+05
				100	1.589338+05	1.531888+05

SECTION IV

OPACITY AND DATA TRANSFORMATION CODES

All of the valid DIAPHANOUS, DIANE, SYLVIA, ALOUETTE, and ZSAZSA opacity information in use at General Atomic has been transmitted on tape to the DASIAC. Enough information has been presented in the code writeups (which follow) to enable these tapes to be read. For further information refer to:

1. DIAPHANOUS data: see the DENSER, DASE, DAPHNE, DYPER4, GRAPH, and TRANS writeups. The DENSER writeup specifies the DASIAC tape format. The other codes listed are able to use, edit, or modify the data as specified in their writeups.
2. DIANE data: see the DIANCT and DIANE-tape-and-card-format writeups, and the GREYS, EGREY, REDGRE, and DYPDIN writeups. The DIANCT and DIANE-tape-and-card-format write-ups specify the DASIAC tape format.
3. SYLVIA, ZSAZSA, and ALOUETTE data: see the EDSILV writeup for a discussion of the DASIAC tape format.

DYPER4: A PLOT PREPARATION CODE FOR OPACITY AND THERMODYNAMIC DATA

The primary functions of the DYPER4 program are to read data from either a DIAPHANOUS, a DENSER, or an ANDIMX tape and prepare plot tapes for the SC-4020. DYPER4 reads one input data tape and either plots opacity data and punches cards containing thermodynamic data, or sets up a one-dimensional array containing thermodynamic data to be plotted by subroutine GRAPH. DYPER4 requires only one data card, containing the following information:

```
00100   C ELT DYPER4/S0824,1,670905, 55095
00100   C EOF 3
00100   C      SUBROUTINE DIAPER
00100   C
00100   C      **** COMPILED SEPTEMBER 28, 1966  SCHALIT/YATES  ****
00100   C
00100   C      VARIABLE NAME  MEANING
00100   C
00100   C      *** AUGEAS ***
00100   C      DELEPJ (2000)  ENERGY CHANGE DURING A TRANSITION (EV)
00100   C      DELEPS (1300)  IONIZATION POTENTIAL OF A STATE (EV)
00100   C      EIN (15)       ENERGY OF GROUND STATE OF AN IONIZATION LEVEL
00100   C      EPSD (1300)    SAME AS EPS IN DIAPHANOUS
00100   C      FPC (3, 3, 3)  FRACTIONAL PERCENTAGE COEFFICIENT FOR TRANSITION BETWEEN
00100   C                     SPLIT CONFIGURATIONS
00100   C      IJD (2000)     IDENTIFICATION NUMBER OF INITIAL STATE ASSOCIATED WITH A
00100   C                     TRANSITION
00100   C      ISPLIT (15, 40)IDENTIFICATION OF A SPLIT CONFIGURATION
00100   C      MERGED (15, 40)TRUE IF THIS CONFIGURATION IS THE AVERAGE OF SOME OTHER
00100   C                     CONFIGURATIONS IN THE TABLE
00100   C      MJD (2000)     NUMBER OF ELECTRONS IN LEVEL FROM WHICH ONE IS REMOVED IN
00100   C                     THIS TRANSITION
00100   C      NFD (1300)     SAME AS NF IN DIAPHANOUS
00100   C      NJD (2000)     PRINCIPAL QUANTUM NUMBER (OR REDUCED QUANTUM NUMBER) OF
00100   C                     ELECTRON REMOVED IN THIS TRANSITION.
00100   C      NQ (6, 15, 40) NUMBER OF ELECTRONS IN AN ELECTRON LEVEL IN A CONFIGURATION
00100   C      NHMAX (15)     NUMBER OF CONFIGURATIONS AT AN IONIZATION LEVEL
00100   C      NRSAVE (1300)  CONFIGURATION IDENTIFICATION OF A STATE
00100   C      NSAVE (1300)   QUANTUM NUMBER OF OUTER ELECTRON, IF BEYOND TABLE, OF A
00100   C                     STATE
00100   C      QJ (1300)      SAME AS Q IN DIAPHANOUS
00100   C      QWT (15, 40)   DEGENERACY OF A CONFIGURATION
00100   C      W0 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
00100   C                     CONFIGURATION
00100   C      W1 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
00100   C                     CONFIGURATION
00100   C      W2 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
00100   C                     CONFIGURATION
00100   C      *** DIAPH2 ***
00100   C      BE (100)       SAME AS BEJ, INDEXED BY (NF + 1) FOR INITIAL STATE
00100   C      BEJ (1600)     PARAMETER DETERMINING LINE WIDTH FOR A TRANSITION
00100   C      C (10)         CONCENTRATION OF AN ELEMENT (ATOMS/ATOM)
00100   C      COM (12)       COMMENT CARD IN FORMAT 12A6
00100   C      DELE (100)     SUM OF DELI AT PREVIOUS IONIZATION LEVELS (EV)
00100   C      DELEPJ (2200)  ENERGY CHANGE DURING A TRANSITION (EV)
00100   C      DELEPS (1500)  IONIZATION POTENTIAL OF A STATE (EV)
00100   C      DELI (100)     PRESSURE IONIZATION AT AN IONIZATION LEVEL (EV)
00100   C      EPS (1500)     ENERGY OF A STATE, USUALLY REFERRED TO THE ENERGY OF THE
00100   C                     GROUND STATE OF THE NEUTRAL ATOM (EV)
00100   C      EPSPRM (1500)  ENERGY OF A STATE AFTER REDUCTION DUE TO PRESSURE IONIZA-
00100   C                     TION (EV)
00100   C      EX (100)       SAME AS EXJ, INDEXED BY (NF + 1) FOR INITIAL STATE
00100   C      EXJ (1600)     PARAMETER DETERMINING LINE LOCATIONS FOR A TRANSITION
00100   C      GAMBLK (10)    ARRAY OF GAMMA
00100   C      IJ (2200)      IDENTIFICATION NUMBER OF INITIAL STATE ASSOCIATED WITH A
00100   C                     TRANSITION
00100   C      MAKEZ (1500)   IDENTIFICATION OF STATE TO BE ELIMINATED
00100   C      MJ (2200)      NUMBER OF ELECTRONS IN LEVEL FROM WHICH ONE IS REMOVED IN
00100   C                     THIS TRANSITION
00100   C      NEW (2200)     ORIGINAL IDENTIFICATION NUMBER OF A TRANSITION
00100   C      NF (1500)      NUMBER OF FREE ELECTRONS FOR A STATE
00100   C      NJ (2200)      TOTAL QUANTUM NUMBER (OR REDUCED QUANTUM NUMBER) OF ELEC-
00100   C                     TRON REMOVED DURING A TRANSITION
00100   C      NLAST (10)     INDEX NUMBER OF LAST STATE IN TABLE FOR AN ELEMENT
00100   C      PHI (2200)     STRENGTH OF EDGE DUE TO THIS TRANSITION
```

```
00100    C      Q (1500)        DEGENERACY OF A STATE
00100    C      R (1500)        FIRST PROPORTIONAL TO LOG POPULATION AND THEN TO POPULATION
00100    C                       OF A STATE
00100    C      RS (10)         FIRST MAXIMUM R, THEN SUM OF R*S, FOR AN ELEMENT
00100    C      SMALLP (1500)   POPULATION OF A STATE
00100    C      TESTJ (2200)    LOWEST VALUE OF MU AT WHICH THE ABSORPTION COEFFICIENT IS
00100    C                      AFFECTED BY THE LINE SERIES FOR THIS TRANSITION
00100    C      TKBLK (10)      ARRAY OF KT
00100    C      U (5)           COEFFICIENTS IN GAUSSIAN INTEGRATION
00100    C      R (5)           COEFFICIENTS IN GAUSSIAN INTEGRATION
00100    C      UOLD (2200)     LOCATION OF EDGE DUE TO THIS TRANSITION (EV/EV)
00100    C      UPHM (2200)     LOWERED EDGE TO APPROXIMATE HIGH LINES (EV/EV)
00100    C      W (10)          ATOMIC WEIGHT OF AN ELEMENT
00100    C      Z (10)          ATOMIC NUMBER OF AN ELEMENT
00100    C      *** DIAPER ***
00100    C      AMU (1000)      ABSORPTION COEFFICIENT AT A PARTICULAR VALUE OF MU(.6 .LE.
00100    C                      MU .LE. 15) (PER CM)
00100    C      BMU (1000)      BOTTOM OF EDGE OCCURING AT A PARTICULAR VALUE OF MU(MU .GT.
00100    C                       15)(PER CM)
00100    C      ID (12)         COMMENT CARD
00100    C      TMU (1000)      TOP OF EDGE OCCURING AT A PARTICULAR VALUE OF U (U>15) (PER
00100    C                       CM)
00100    C      *** SPECTRA ***
00100    C      DEFECT (100, 4)QUANTUM DEFECT INDEXED BY THE IONIZATION LEVEL AND L + 1
00100    C      DELEPJ (3500)   SAME AS DELEPJ IN DIAPHANOUS
00100    C      DELEPS (1750)   SAME AS DELEPS IN DIAPHANOUS
00100    C      EPSD (1750)     SAME AS EPS IN DIAPHANOUS
00100    C      IJD (3500)      SAME AS IJ IN DIAPHANOUS
00100    C      IONZC (100)     ZCORE FOR AN IONIZATION LEVEL
00100    C      L (19)          L FOR AN ELECTRON LEVEL
00100    C      LIN (10)        LEVEL AT WHICH AN ELECTRON IS BEING ADDED
00100    C      LOUT (10)       LEVEL AT WHICH AN ELECTRON IS BEING REMOVED
00100    C      MJD (3500)      SAME AS MJ IN DIAPHANOUS
00100    C      N (19)          N FOR AN ELECTRON LEVEL
00100    C      NE (92, 19)     NUMBER OF ELECTRONS PER ELECTRON LEVEL IN THE GROUND STATE
00100    C                      OF AN IONIZATION LEVEL
00100    C      NFD (1750)      SAME AS NF IN DIAPHANOUS
00100    C      NJD (3500)      SAME AS NJ IN DIAPHANOUS
00100    C      QJ (1750)       SAME AS Q IN DIAPHANOUS
00100    C                                                                       3MAN0040
00101           DIMENSION AMU(3000), BMU(1500), TMU(1500), U1(3000), U2(1500) ,
00101          1A(682), TX(2), TY(2), CHARA(4), CHARB(3), AA(20),
00101          2 CHARC(4), CHARD(3), CHARE(3), CHARG(3), CHARH(3)               3MAN0070
00101          3 , BCDBLK(40), HUB(14), IHUB(13), HUBB(8), COMP(10), IZ(10)
00103           EQUIVALENCE (AA(1),ZBAR), (AA(2),RHO), (AA(3),BIGP), (AA(4),EPSMAL
00103          1), (AA(5),AKAPPA), (AA(6),WAMBDA), (AA(7),EIPART), (AA(8),BAMNEW)
00104           EQUIVALENCE (BCDBLK, CHARA), (BCDBLK(5), CHARC),                3MAN0090
00104          1             (BCDBLK(6), CHARB), (BCDBLK(9), CHARD),            3MAN0100
00104          2             (BCDBLK(12), CHARE), (BCDBLK(15), CHARG),          3MAN0110
00104          3 ( BCDBLK(18), CHARH), (HUBB(2), UIN), (HUBB(3), DUI)
00104    C                                                                       3MAN0130
00105           INTEGER ANDIMX,DENSER
00106           INTEGER W
00107           EQUIVALENCE(IUX,UX)
```

```
00107    C
00110          COMMON/PRSA/NFRAME, SAVET, SECRET(4), ANDIMX, IDANDI(12,5)
00110    C
00111          COMMON/CIA/DYPOUT(5000)
00112          DATA DYPOUT/5000*0./
00114          COMMON/DCII/IEND(100), NPTS(100), J1, NAME, ID(12)
00115          DATA J1/1/, MARKER/-9/, EPSILN/1.E-4/, IEND,NPTS/200*0/
00123          DATA IENDED/0/
00125          DATA MIN/10/
00125    C     MIN = 10  COMPRESSED INPUT TAPE UNIT.
00125    C
00125    C     HUB(3) IS TEMPERATURE IN EV
00125    C     HUB(4) IS DENSITY IN GM/CM2
00125    C     HUB(8) IS ZBAR
00125    C     HUBB(5) IS ROSSELAND MEAN CONTINUOUS OPACITY IN CM2/GM
00125    C     HUBB(6) IS ROSSELAND MEAN (TOTAL RADIATION) OPACITY IN CM2/GM
00125    C
00127          DATA NFRAME, SAVET/0.0,0/SECRET/6HSECRET,6H R/D -,6HGROUP ,
00127         16H 1    / ANDIMX/6HANDIMX/,DENSER/6HDENSER/
00127    C
00127    C                                                                     3MANO150
00127    C             FORMAT OF INTERMEDIATE DIAPHANOUS TAPE                  3MANO160
00127    C       SIGNAL                                                        3MANO170
00127    C         -1.   NEXT RECORD CONTAINS IDENTIFICATION CARD              3MANO180
00127    C         -2.   BEGINNING OF CASE.  NEXT RECORD CONTAINS TEMPERATURE AND3MANO190
00127    C               GAMMA.  SUCCEEDING RECORDS CONTAIN COMPUTED ABSORPTION  3MANO200
00127    C               COEFFICIENTS, WITH LINES, FOR U LESS THAN 15.         3MANO210
00127    C         -6.   TRANSITIONS HAVE BEEN EXHAUSTED BEFORE REACHING U = 15. 3MANO220
00127    C               FOLLOWING RECORDS CONTAIN SOME EXTRAPOLATED VALUES.   3MANO230
00127    C         -3.   FOLLOWING RECORDS CONTAIN DATA, WITHOUT LINES, FOR U  3MANO240
00127    C               GREATER THAN 15.                                      3MANO250
00127    C         -4.   NEXT RECORD CONTAINS SUMMARY OF RESULTS.  END OF CASE.  3MANO260
00127    C         -5.   END OF TAPE.                                          3MANO270
00127    C                                                                     3MANO280
00127    C
00127    C                       FORMAT OF ANDIMX TAPE
00127    C
00127    C                 A) A FIRST RECORD OF: ANDIMX
00127    C                 B) A SECOND RECORD OF: 60 IDENTIFICATION WORDS
00127    C                 C) A SIGNAL RECORD OF: -7. (DATA FOLLOWS FOR A GIVEN
00127    C                      TEMPERATURE-DENSITY POINT
00127    C                 D) A 38 WORD RECORD  (CAYT IS WORD(3), RHO IS WORD(4))
00127    C                 E) A RECORD WITH (NMAX+1) WORDS: NMAX,(MU(J),J=1,NMAX)
00127    C
00127    C                 RECORDS (C,D,AND E) ARE THEN REPEATED. TEMPERATURES
00127    C                 AND DENSITIES ARE MONOTONIC. TEMPERATURES ARE LOWEST
00127    C                 AT THE BEGINNING OF THE TAPE.THE HIGHEST DENSITY FOR
00127    C                 A GIVEN TEMPERATURE IS THE FIRST DENSITY AT THAT
00127    C                 TEMPERATURE.
00127    C
00127    C                 F) A SIGNAL RECORD OF: -5. SIGNIFIES END OF DATA.
00127    C
00135        5 FORMAT  (12A6)                                                  3MANO290
00136        6 FORMAT (1H1,12A6/15H0TEMPERATURE = , F10.3////6X, 5HGAMMA, 6X
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00136          1        11HRHO(GM/CM3), 6X, 7HP(BARS), 5X, 12HENG(ERGS/GM), 3X,    3MAN0310
00136          2        13HEION(ERGS/GM), 3X, 12HKROS(CM2/GM), 2X,                 3MAN0320
00136          3        12HKPLK(CM2/GM), 3X, 4HZBAR, 5X, 4HEGAM)                   3MAN0330
00137       11 FORMAT (6HTHETA=, F12.2, 6HGAMMA=, E12.5, 6HMUZRO=, E12.3,          3MAN0340
00137          1        6HMUONE=, E12.3)                                           3MAN0350
00140       12 FORMAT (48H    0     5    10    15     1    10   100  1000)         3MAN0360
00141       13 FORMAT (52H THERE IS AN ERROR IN THIS RUN.  CONSULT PROGRAMMER      3MAN0370
00141          1        33HBEFORE SENDING TAPE H TO PLOTTER.)                      3MAN0380
00142       14 FORMAT (10H THERE ARE, I4, 33H FRAMES ON TAPE H.   PLEASE NOTE      3MAN0390
00142          1        47HTHIS ON THE SAVE TAPE REQUEST, IF THERE IS ONE.)        3MAN0400
00143       15 FORMAT(1P2E13.3, 3E15.3, E15.2, E13.1, 0PF11.2, F9.2)               3MAN0410
00144       18 FORMAT(1P6E10.4, 0P2F6.3)                                           3MAN0420
00145       19 FORMAT(1PE10.4)                                                     3MAN0430
00146          REWIND 16
00146     C
00146     C    TKIN  IS THE TEMPERATURE AT WHICH PLOTTING BEGINS
00146     C    TKEND IS THE LAST TEMPERATURE WHICH IS PLOTTED
00146     C    M     IF (M .GT. 0) THE VALUE OF AMIN IS CHANGED TO THE HIGHEST
00146     C          POWER OF 10 WHICH DIVIDES AMIN
00146     C          IF (M .EQ. 0) AMIN IS NOT CHANGED
00146     C    N     IF (N .GT. 0) HUEBNER DATA IS ONLY PLOTTED FOR U FROM U = .3
00146     C          TO U = 15.
00146     C    IPLOT1  DETERMINES WHETHER THE DYPOUT ARRAY IS TO BE FILLED.
00146     C          IF (IPLOT1 .EQ. 1) USE DYPOUT ARRAY
00146     C          IF (IPLOT1 .NE. 1) NORMAL PLOTTING PATH
00146     C
00146     C
00146     C    FOLLOWING ARE THE VARIABLES STORED IN DYPOUT(I) (AND INTEGRAL
00146     C      MULTIPLES OF I)
00146     C
00146     C    I          SADY VARIABLE      HUEBNER VARIABLE
00146     C    1          TK                 TK
00146     C    2          RHO                RHO
00146     C    3          GAMMA
00146     C    4          PRESHR
00146     C    5          ENERGY
00146     C    6          EION
00146     C    7          KPLK               CROPA
00146     C    8          KROS               TROPA (KROS)
00146     C    9          ZBAR               CAPNF (ZBAR)
00146     C    10         EGAM
00146     C
00146     C
00146     C    READ INPUT CARD 1/1
00147          READ (5,101) TKIN, TKEND, SIZ, M, N, IPLOT1, IBCD0
00160      101 FORMAT (3F10.4,4(5X,I5))
00161          WRITE (6,3) TKIN, TKEND, SIZ, M, N, IPLOT1, IBCD0
00172        3 FORMAT (17H INPUT AS READ IS//11H TKIN    = ,E12.4, /11H TKEND   =
00172       1   ,E12.4,/11H SIZ     = ,E12.4,/11H M       =  ,I5,/11H N       =
00172       2 ,I5,/10H IPLOTI  =,I5,/11H IBCD0    = ,I5)
00172     C
00173           IF (TKEND .LT. 1.E-35) TKEND=1.E38
00173     C
00175          WRITE (6,4)  TKIN, TKEND, SIZ, M, N, IPLOT1, IBCD0
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00206           4 FORMAT (17H0INPUT AS USED IS//11H TMIN    = ,E12.4, /11H TMEND   =
00206            1 ,E12.4,/11H SIZ      = ,E12.4,/11H M        = ,I5,/11H N        =
00206            2 ,I5,/10H IPLOT1  =,I5,/11H IGCDO    = ,I5,/1H1)
00206     C
00207              IF (IPLOT1 .EQ. 1) GO TO 400
00207     C       DO PLOTTING OF THERMO OR DO (PLOTS OF MU VS. U AND PUNCH CARDS)
00207     C       BUT NOT BOTH
00207     C
00207     C
00211           CALL SETUP(A,662,16)
00212           CALL GCDCON (GCDBLK)                                          3MAN0450
00213           WRITE (0, I2)                                                 3MAN0460
00213     C     P R O C E S S   I N P U T                                     3MAN0470
00213     C
00215       400 CONTINUE
00216           IF (IGCDO .EQ. 0) GO TO 9401
00220           REWIND 15
00221           READ(15)UX
00224           NAME = IUX
00225           IIUX=UX-.5
00226           IF(IIUX .EQ. (-1)) GO TO 100
00230           IF (IUX .EQ. ANDIMX) GO TO 700
00232           WRITE(6,7999) UX, IIUX, IUX, IUX
00240      7999 FORMAT (26H PROBLEM WITH FIRST RECORD /5X,1PE15.8,2X,I4,2X,A6, 2X0
00240          14)
00241           GO TO 999
00242      9401 CONTINUE
00243           READ (MIN,7401) IUX, (ID(I),I=1,12), N2, (COMP(K),I2(K),K=1,N2)
00260           NAME=        IUX
00261      7401 FORMAT (13A6, / I2,  (F6.4, I2))
00262           IF (IUX .EQ. DENSER) GO TO 9403
00264      9402 CONTINUE
00265           WRITE (6,7999) UX, IUX, IUX, IUX
00273           GO TO 999
00274      9403 CONTINUE
00275           WRITE (6,7404) JJ, II, ULAST, AKLAST, TK, GAMMA, (AA(K),K=1,20),
00275          1(U1(I),I=6,II), (AMU(I),I=6,II), (U2(I), I=2,JJ), (BMU(I),I=2,JJ),
00275          2(TMU(I),I=2,JJ)
00335      7404 FORMAT (2I4, 13E9.4, /(14E9.4))
00335     C     IF (JJ .GT. 1500) THE A ARRAY HAS BEEN WIPED OUT
00336      9404 CONTINUE
00337           READ (MIN,7404) JJ,II, ULAST, AKLAST, TK, GAMMA, (AA(K),K=1,20),
00337          1(U1(I), I=6,II), (AMU(I),I=6,II), (U2(I),I=2,JJ), (BMU(I),I=2,JJ),
00337          2(TMU(I),I=2,JJ)
00377           IF (JJ .GT. 0) GO TO 9000
00401           NEND = 2
00402           GO TO 260
00403      9000 CONTINUE
00404           IF ((II .GT. 150) .OR. (JJ .GT. 1500)) GO TO 9405
00406           ITCH = 10000
00407  *DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
00407           IF (ULAST .NE. 0.) ITCH=II
00411           NO=2
00412  *DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
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00412           IF (U2(2) .NE. 0.)  NO=1
00414           DO 9406 I=6,II
00417           U1(I-5) = U1(I)
00420           AMU(I-5) = AMU(I)
00421      9406 CONTINUE
00423           DO 9407 I=2,JJ
00426           U2(I-1) = U2(I)
00427           BMU(I-1) = BMU(I)
00430           TMU(I-1) = TMU(I)
00431      9407 CONTINUE
00433           IMAX=          II - 5
00434           JMAX=          JJ - 1
00435           GO TO 9403
00436       100 CONTINUE
00437           NAME = -1
00440           READ(15)(ID(I),I=1,12)
00446      9403 CONTINUE
00447             IF (IPLOT1 .EQ. 1) GO TO 401
00451           PUNCH 5, (ID(I), I = 1, 12)                                    3MAN0510
00457           CALL FRAME(0.0, 1.0, 1.0, 0.0)                                 3MAN0520
00460           CALL TSP(0.2, 0.5, ID, 72)                                     3MAN0530
00461           CALL ADF                                                       3MAN0540
00462           NFRAME=NFRAME+1                                                3MAN0550
00463       401 CONTINUE
00464           IF (IBCDO .EQ. 0)  GO TO 9404
00466           READ(15)UX
00471             IF (ABS(UX+2.) .LT. EPSILN) GO TO 32
00473           WRITE (6,20) UX
00476        20 FORMAT (74HONO SIGNAL OF -2. FOLLOWS FIRST (ID) RECORD ON THE DIAP
00476          1HANOUS TAPE.  UX = , F10.4)
00477           GO TO 999
00477    C      READ IN MU VERSUS U FOR GIVEN T, GAMMA                         3MAN0580
00500        32 CONTINUE
00501           READ (15) TK, GAMMA
00505           I = 1                                                          3MAN0600
00506           ITWCH = 10000                                                  3MAN0610
00507        34 READ(15)U1(I),AMU(I)
00513             IF (ABS(U1(I) + 3.) .LT. EPSILN) GO TO 60
00515             IF (ABS(U1(I) + 6.) .LT. EPSILN) GO TO 40
00517             IF (ABS(U1(I) + 4.) .LT. EPSILN) GO TO 73
00521           I = I + 1                                                      3MAN0660
00522           GO TO 34                                                       3MAN0670
00523        40 ITWCH = I - 1                                                  3MAN0680
00524           GO TO 34                                                       3MAN0690
00525        60 NO = 1                                                         3MAN0700
00526           J = 1                                                          3MAN0710
00527        65 READ(15)U2(J),BMU(J),TMU(J)
00534             IF (ABS(U2(J) + 4.) .LT. EPSILN) GO TO 75
00536           J = J + 1                                                      3MAN0740
00537           GO TO 65                                                       3MAN0750
00540        73 NO = 2                                                         3MAN0760
00541        75 CONTINUE
00542           READ (15) ZBAR,RHO,SIGP,EPSMAL,AKAPPA,WAMBDA,EIPART,GAMNEW
00544           IMAX = I - 1                                                   3MAN0780
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00555                JMAX = J - 1                                              3MAN0790
00585         C
00556          9408 CONTINUE
00557                  IF ((TK+EPSILN).LT.TKIN .OR. TK.GT.(TKEND+EPSILN)) GO TO 291
00561                  IF (IPLOT1 .EQ. 1) GO TO 410
00561         C
00561         C      START PLOTTING FIRST FRAME                                3MAN0830
00563             80 CALL FRAME(0.0, 20.0, 20.0, 0.0)                          3MAN0840
00564                CALL GXA(4, 0.7, 1.0, 8.25)                               3MAN0850
00565                CALL GYA(4, 1.0, 0.9, 5.0)                                3MAN0860
00566                CALL TSP(1.5, 19.0, ID, 72)                               3MAN0870
00567                AMIN = 1.E9                                               3MAN0880
00570                DO  120  I = 1, IMAX                                      3MAN0890
00573            120 AMIN= AMIN1(AMIN, AMU(I))                                 3MAN0900
00575                IF (M .EQ. 0) GO TO 81
00577                I2 = IFIX(ALOG10(AMIN))
00600                IF (I2 .LE. 0) I2 = I2 - 1
00602                AMIN = 10.**I2
00603             81 CONTINUE
00604                GO TO (83, 84), NO                                        3MAN0910
00605             83 BMIN = 1.E9                                               3MAN0920
00606                DO  190  J = 1, JMAX                                      3MAN0930
00611           190   IF ((U2(J)-150.) .LT. 1.E-37) BMIN = AMIN1(BMIN, BMU(J))
00614             84 CALL WCDCON (BCDBLK(9))                                   3MAN0950
00615                WRITE (0, 11) TK, GAMMA, AMIN, BMIN                       3MAN0960
00623                CALL TSP(1.3, 2.6, CHARD, 18)                             3MAN0970
00624                CALL TSP(1.3, 2.3, CHARE(1), 18)                          3MAN0980
00625                DO  90  I = 1, 4                                          3MAN0990
00630                XTYP = 5. * FLOAT(I) - 4.7                                3MAN1000
00631             85 CALL TSP(XTYP, .6, CHARA(I), 8)                           3MAN1010
00632                YTYP = 6.25 * FLOAT(I) - 5.25                             3MAN1020
00633             90 CALL TSP(.1, YTYP, CHARC(I), 8)                           3MAN1030
00635                CALL TSP(1.3, 2.0, CHARB, 18)                             3MAN1040
00635         C      PLOT MU VERSUS U                                          3MAN1050
00636                DO  150  I = 1, IMAX                                      3MAN1060
00641                PMU1= 2.7143 * ALOG(AMU(I) / AMIN) + 1.0                  3MAN1070
00642                IF (I .EQ. 1) GO TO 140                                   3MAN1080
00644                TX(1) = TX(2)                                             3MAN1090
00645                IF (ITWCH .GE. I) GO TO 134                               3MAN1100
00647                TY(1) = TY(2)                                             3MAN1110
00650                TX(2) = U1(I) + 1.00                                      3MAN1120
00651            134 TY(2) = AMIN1(PMU1, 20.)                                  3MAN1130
00652                IF (TY(1) .GT. 20.) GO TO 150                             3MAN1140
00654            138 CALL DVR(1, 0, TX, TY, 1)                                 3MAN1150
00655                IF (ITWCH .LT. I) GO TO 150                               3MAN1160
00657            140 TX(1) = U1(I) + .95                                       3MAN1170
00660                TY(2) = PMU1                                              3MAN1180
00661                TX(2) = U1(I) + 1.05                                      3MAN1190
00662                TY(1) = AMIN1(PMU1, 20.)                                  3MAN1200
00663                  IF ((PMU1-20.) .LT. 1.E-37) CALL DVR(1, 0, TX, TY, 1)
00665            150 CONTINUE                                                  3MAN1220
00667                CALL ADF                                                  3MAN1230
00670                NFRAME=NFRAME+1                                           3MAN1240
00671                GO TO (160, 248), NO                                      3MAN1250
```

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C     START PLOTTING SECOND FRAME
  160 CALL GXA(4, 0.7, 1.0, 6.25)
      CALL GYA(3, 1.0, 0.9, 6.25)
      CALL TSP(1.5, 19.0, 1D, 72)
      CALL TSP(1.3, 2.6, CHARD, 10)
      CALL TSP(1.3, 2.3, CHARE, 10)
      DO  160  I = 1, 4
      XTYP = 6.25 * FLOAT(I) - 5.75
      YTYP = 0.7
  170 CALL TSP(XTYP, YTYP, CHARG(I), 6)
      XTYP = 0.1
      YTYP = 6.25 * FLOAT(I) - 5.25
  160 CALL TSP(XTYP, YTYP, CHARC(I), 6)
      CALL TSP(1.3, 2.0, CHARH, 16)
C     PLOT MU VERSUS U
      DO  240  J = 1, JMAX
      PU = 2.7143 * ALOG(U2(J) / 10.0) + 1.0
         IF (PU .GT. 20.) GO TO 9999
      PMU1=  1.0+ 2.7143 * ALOG(TMU(J) / GMIN)
      PMU2=  1.0+ 2.7143 * ALOG(BMU(J) / BMIN)
  210 TX(2) = PU
      IF (J .EQ. 1) GO TO 230
      TY(1) = TY(2)
      TY(2) = PMU2
        IF ( PMU2 .GT. -1.E-37) GO TO NPMU1, (210, 230)
        IF ((U2(J)-150.) .LT. 1.E-37) GO TO 999
      GO TO 230
 9999 CONTINUE
      WRITE (6,9998) TK, GAMMA, (U2(JJ),GMU(JJ),TMU(JJ),JJ=J,JMAX)
 9998 FORMAT (11H0U=PU,GT.20,3X,9H AT TK = ,0PF10.2,13H AND GAMMA = ,
     1        1PE12.5 / (15X,4HU = ,1PE12.0,6X,8H BMMU = ,1PE12.0,6X,
     2        7H TMU = ,1PE12.5) )
      GO TO 9997
  218 CALL DVR(1,0,TX, TY, 1)
  230 TX(1) = PU
      TY(1) = PMU2
      TY(2) = PMU1
      ASSIGN 218 TO NPMU1
        IF (PMU2 .GT. -1.E-37) GO TO 233
      TY(1) = 1.
        IF((PMU1-1.) .GT. -1.E-37) GO TO 233
      TY(2) = 1.
      GO TO 240
  233   IF ((PMU1-20.) .LT. 1.E-37) GO TO 237
      TY(2) = 20.
      ASSIGN 230 TO NPMU1
      IF (PMU2 .GT. 20.) GO TO 240
  237 CALL DVR(1, 0, TX, TY, 1)
  240 CONTINUE
 9997 CONTINUE
      CALL ADF
      NFRAME=NFRAME+1
  242 CONTINUE
        IF (IPLOT1 .EQ. 1) GO TO 410
```

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01004            IF (ABS((TK-SAVET)/TK) .LT. EPSILN) GO TO 250
01006       245 CONTINUE
01007           WRITE (6,8) (ID(I), I=1,12), TK
01016           PUNCH 19, TK
01021           SAVET=      TK
01022           WRITE (6,2) AMIN
01025         2 FORMAT(8H AMIN = , 1PE15.8)
01026       250 CONTINUE
01027           WRITE (6,15) GAMMA,RHO,BIGP,EPSMAL,EIPART,AKAPPA,WAMBDA,ZBAR,
01027          1 GAMNEW
01042           PUNCH 18, RHO, BIGP, EPSMAL, EIPART, AKAPPA, WAMBDA, ZBAR, GAMNEW
01054       251 CONTINUE
01055           NEND=         1
01056           IF (IBCDO .EQ. 0) GO TO 9404
01060           READ (15) UX
01063             IF (ABS(UX+5.) .LT. EPSILN) NEND = 2
01065             IF (ABS(UX+7.) .LT. EPSILN) NEND = 3
01065     C
01067           GO TO ( 32,260, 720 ), NEND
01070       260 CONTINUE
01071             IF (IPLOTI .EQ. 1) GO TO 420
01073           CALL FRAME(0.0, 1.0, 1.0, 0.0)
01074           CALL TSP(.2, .5, ID, 72)                                        SMAN1790
01075           CALL ADF                                                        SMAN1800
01076       270 CALL FINISH
01077           NFRAME=NFRAME+1                                                 SMAN1820
01100           PRINT 14,NFRAME                                                 SMAN1830
01103           WRITE (6, 14) NFRAME                                            SMAN1840
01106           GO TO 820
01107       700 CONTINUE
01107     C
01107     C     READ START OF ANDIMX TAPE
01107     C
01110           READ (15)(( IDANDI(I,J), I=1,12), J=1,5)
01121             IF (IPLOTI .EQ. 1) GO TO 405
01123           PUNCH 26, (( IDANDI(I,J), I=1,12), J=1,5)
01134        26 FORMAT (12A6)
01135           CALL FRAME( 0.0,1.0,1.0,0.0 )
01136           DO 710 J = 1,5
01141           YTYP = 0.56 - FLOAT(J) * 0.04
01142       710 CALL TSP( 0.2, YTYP, IDANDI(1,J), 72 )
01144           CALL TSP( 0.42, 0.8, SECRET, 20 )
01145           CALL ADF
01146           NFRAME = NFRAME + 1
01147       405 CONTINUE
01150           READ (15) UX
01153       790 CONTINUE
01154           NEND=         1
01155             IF (ABS(UX + 5.) .LT. EPSILN) NEND=2
01157             IF (ABS(UX + 7.) .LT. EPSILN) NEND=3
01161           GO TO (32,999 ,720), NEND
01161     C
01161     C     PROCESS HUEBNER DATA FOR GIVEN THETA, RHO
01161     C
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01162        720 READ (15) HUB, IHUB, HUBB
01200            GAMMA=      0.
01201            BIGP=       0.
01202            EPSMAL=     0.
01203            E1PART=     0.
01204            GAMNEW=     0.
01205            TK=         HUB(3)
01206            RHO=        HUB(4)
01207            ZBAR=       HUB(6)
01210            WAMBDA=     HUBB(5)
01211            AKAPPA=     HUBB(6)
01212            READ(15) MAXU, ( AMU(I), I=1, MAXU )
01221              IF ((TK+EPSILN).LT.TKIN .OR. TK.GT.(TKEND+EPSILN)) GO TO 831
01223              IF (IPLOT1 .EQ. 1) GO TO 410
01225              IF (ABS((TK-SAVET)/TK).LT. EPSILN) GO TO 403
01227            WRITE (6,21) ((IDANOI(I,J), I=1,12), J=1,5), TK
01241         21 FORMAT (1H1,5(1X,12A6/),///15H0TEMPERATURE = ,0PF12.5,15H ELECTRON
01261          1 VOLTS //16X,3HRHO,10X,4HZBAR,9X,5HTROPA,9X,5HCROPA )
01242            PUNCH 19, TK
01245            SAVET=      TK
01246        403 CONTINUE
01247            WRITE (6,22)    RHO, ZBAR, AKAPPA, WAMBDA
01255         22 FORMAT (3X,1P4E14.5)
01256            PUNCH 16, RHO, ZBAR, AKAPPA, WAMBDA
01256      C
01256      C     START PLOTTING FIRST FRAME OF HUEBNER DATA
01256      C
01264            CALL FRAME( 0.0,40.0,40.0,0.0 )
01265            CALL GXA( 4, 1.4, 2.0, 12.50 )
01266            CALL GYA( 7, 2.0, 1.0, 5.0 )
01267            DO 740 J = 1,5
01272            YTTP = 36.2 - FLOAT(J) * 0.6
01273        740 CALL TSP( 3.0, YTTP, IDANOI(1,J), 72 )
01275            CALL TSP( 3.0, 39.0, SECRET, 20 )
01276            CALL BCDCON( BCDBLK(21) )
01277            WRITE ( 0, 750 )
01301        750 FORMAT(66H     0     5    10    15    20    25    30     1    10
01301          1 100  1000)
01302            DO 755 I = 1,7
01305            XTYP = 5.0* FLOAT(I) - 4.7
01306            J = 20 + I
01307        755 CALL TSP( XTYP,1.2,BCDBLK(J),6 )
01311            DO 756 I = 1,4
01314            J = 27 + I
01315            YTTP = 12.5 * FLOAT(I) - 10.5
01316        756 CALL TSP( 0.2, YTTP, BCDBLK(J), 6 )
01320            AMIN = 1.E9
01321            DO 760 I = 1,MAXU, 5
01324        760 AMIN = AMIN1( AMIN, AMU(I) )
01326            IF (M .EQ. 0) GO TO 757
01330            I2 = IFIX(ALOG10(AMIN))
01331            IF (I2 .LE. 0) I2 = I2 - 1
01333            AMIN = 10.**I2
01334        757 CONTINUE
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01335          CALL BCDCON( BCDBLK(32) )
01336          WRITE( 0, 840 ) TK, RHO, AMIN
01343      840 FORMAT( 6HTHETA=, F12.2, 6HRHO = , E12.5, 6HMU2RO=, E12.3 )
01344          CALL TSP( 2.6, 5.2, BCDBLK(32), 18 )
01345          CALL TSP( 2.6, 4.6, BCDBLK(35), 18 )
01346          CALL TSP( 2.6, 4.0, BCDBLK(38), 18 )
01347          DO 770 I = 1, MAXU, 5
01352          U1(I) = UIN + FLOAT( I - 1 ) * DUI
01353          PMU1 = 5.4286 * ALOG( AMU(1)/AMIN ) + 2.0
01354          IF( I .EQ. 1 )   GO TO 780
01356          TX(1) = TX(2)
01357          TY(2) = AMIN1( PMU1, 39.5 )
01360          IF( TY(1) .GT. 40.0 )  GO TO   770
01362          CALL DVR( 1, 0, TX, TY, 1 )
01363      780 TX(1) = U1(I) + 1.985
01364          TY(2) = PMU1
01365          TX(2) = U1(I) + 2.015
01366          TY(1) = AMIN1( PMU1, 39.5 )
01367            IF ((PMU1-39.5) .LT. 1.E-37) CALL DVR(1, 0, TX, TY, 1)
01371      770 CONTINUE
01373          CALL ADF
01374          NFRAME = NFRAME + 1
01374    C
01375      801 CONTINUE
01376          READ (15) UX
01401          NEND = 1
01402            IF (ABS(UX + 5.) .LT. EPSILN) NEND = 2
01404            IF (ABS(UX + 7.) .LT. EPSILN) NEND = 3
01406          GO TO ( 32, 800, 720 ), NEND
01406    C
01407      800 CONTINUE
01410            IF (IPLOT1 .EQ. 1) GO TO 420
01412          CALL FRAME (0.0, 1.0, 1.0, 0.0)
01413          DO 810 I = 1,5
01416          YTYP = 0.56 - FLOAT(I) * 0.04
01417      810 CALL TSP( 0.2, YTYP, IDANDI(I,1), 72 )
01421          CALL ADF
01422          CALL FINISH
01423          NFRAME = NFRAME + 1
01424          PRINT 14, NFRAME
01427      820 CONTINUE
01430          IF (IBCD0  .NE. 0) REWIND 15
01432   *DIAGNOSTIC*  THE RETURN STATEMENT IS ILLEGAL IN A MAIN PROGRAM. IT WAS CHANGED TO STOP.
01432          RETURN                                                        3MAN1050
01433      999 PRINT 13                                                      3MAN1060
01435          WRITE (6, 13)                                                 3MAN1070
01437          CALL DUMP
01440          GO TO 270                                                     3MAN1090
01440    C
01440    C
01440    C     SECTION FOR FILLING DYPOUT ARRAY, IPLOT1 .EQ. 1
01440    C
01441      420 CONTINUE
01441    C
```

```
01442           IF (ABS((TK-SAVET)/TK) .LT. EPSILN) GO TO 411
01442    C     IF ABOVE TRUE THEN PRESENT TEMPERATURE IS SAME AS LAST PREVIOUS
01442    C     TEMPERATURE
01444           IF (NAME .EQ. ANDIMX) GO TO 421
01444    C
01444    C     NEW TEMPERATURE, DIAPHANOUS INPUT TAPE
01446          WRITE (6,8) (ID(I), I=1,12), TK
01455          GO TO 420
01455    C
01456      421 CONTINUE
01456    C     NEW TEMPERATURE, ANDIMX INPUT TAPE
01456    C
01457          WRITE (6,21) ((IDANDI(I,J), I=1,12), J=1,5), TK
01457    C
01457    C
01471      420 CONTINUE
01472           IF (SAVET .LT. 1.E-37 .AND. NEND.NE.2) GO TO 412
01474          IEND(J1)=     MARKER + 9
01475          NPTS(J1)=     (IEND(J1)-IENDED)/10
01476          IENDED=       IEND(J1)
01477           IF (NEND .EQ. 2) GO TO 430
01501          J1=           J1 + 1
01502      412 CONTINUE
01503          SAVET=        TK
01504      411 CONTINUE
01505           IF (NAME .EQ. ANDIMX) GO TO 422
01507          WRITE (6,15) GAMMA, RHO, BIGP, EPSMAL, EIPART, AKAPPA, WAMBDA,
01507        1     ZBAR, GAMNEW
01522          GO TO 423
01522    C
01523      422 CONTINUE
01524          WRITE (6,22) RHO, ZBAR, AKAPPA, WAMBDA
01524    C
01532      423 CONTINUE
01532    C
01533          MARKER=       MARKER + 10
01534          DYPOUT(MARKER)=      TK
01535          DYPOUT(MARKER+1)=   GAMMA
01536          DYPOUT(MARKER+2)=    RHO
01537          DYPOUT(MARKER+3)=   BIGP
01540          DYPOUT(MARKER+4)=   EPSMAL
01541          DYPOUT(MARKER+5)=   EIPART
01542          DYPOUT(MARKER+6)=   AKAPPA
01543          DYPOUT(MARKER+7)=   WAMBDA
01544          DYPOUT(MARKER+8)=   ZBAR
01545          DYPOUT(MARKER+9)=   GAMNEW
01545    C
01546          GO TO 251
01546    C
01547      430 CONTINUE
01550          J3=           IEND(J1)
01551          WRITE (6,23) J1, (L, NPTS(L), IEND(L), L=1,J1)
01562       23 FORMAT (1H1,I5,57H SET(S) OF OUTPUT PARAMETERS HAVE BEEN STORED AS
01562        1 FOLLOWS //10X,1HI,13X,7HNPTS(I),13X,7HIEND(I)/(6X,I5,15X,I5,15X,
01562        2 I5))
01563          WRITE (6,24) (DYPOUT(LL), LL=1,J3)
01571       24 FORMAT (16H1DYPOUT ARRAY IS  /(1P10E12.5))
01572          WRITE (6,25)
01574       25 FORMAT (35H0DYPER4 RUN COMPLETED SUCCESSFULLY. )
01575          CALL GRAPH
01576          GO TO 820
01577          END

     END OF LISTING.     3 *DIAGNOSTIC* MESSAGE(S).
```

COLUMNS	FORMAT	INPUT VARIABLE	MEANING
1-10	F10.4	TKIN	Temperature at which plotting of opacity data and punching (of thermodynamic quantities) begin, or temperature at which array (of thermodynamic quantities) starts to be filled
11-20	F10.4	TKEND	Last temperature for which opacity data are plotted and thermodynamic quantities are punched on cards, or last temperature for which data are stored for plots of thermodynamic quantities
21-30	F10.4	SIZ	Not used
36-40	I5	M	If (M.GT.0), the value of AMIN is changed to the highest power of 10 which divides AMIN If (M.EQ.0), AMIN is not changed
46-50	I5	N	If (N.GT.0), ANDIMX (Huebner) opacity data are plotted only for u = 0.3 to u = 15. If (N.EQ.0), all ANDIMX (Huebner) opacity data are plotted
56-60	I5	IPLOT1	If (IPLOT1 .EQ.0), DYPER4 does opacity plots and punches cards containing thermodynamic data If (IPLOT1.EQ.1), DYPER4 fills an array of thermodynamic quantities to be plotted by subroutine GRAPH
66-70	I5	IBCD0	If (IBCD0 .EQ. 0), the input data tape is a DENSER BCD data tape If (IBCD0 .NE. 0), the input data tape is a binary DIAPHANOUS or ANDIMX data tape

To use the DYPER4 program, the following tapes must be mounted:

1. One input data tape
   a. DENSER data tape - mount on unit 10
   b. DIAPHANOUS or ANDIMX data tape - mount on unit 15

2. The output (plot) tape, which must be written at a tape density of 556 BPI - mount on unit 16.

The plots in this volume were prepared by the DYPER4 program. Plots of the absorption coefficients as a function of frequency (at a given temperature - density point for these materials) are being prepared.

GRAPH: A PLOTTING PROGRAM

The GRAPH subprogram is used in conjunction with either the DYPER4, TRANS, or GOLEM programs. Given a one-dimensional array of variables set up in regularly spaced repeating groups, GRAPH produces SC-4020 plot tapes of user-specified quantities. It is written in FORTRAN IV language. The plots produced have, on each curve, the dependent variable plotted versus one of the (assumed) two independent variables, while one independent variable is held constant. Five cards per plot are required as GRAPH input. They are:

1. Two cards containing the following information:
   a. Card 1/2 in format (4(I2, 1X), 6X, 15(I2, 1X)) specifying all data necessary to plot values. (Values are read into (IN(J), J=1, 4) and (OPN(JJ), JJ=1, 15))
      1. If (IN(1). EQ. O) all plotting is done
      2. If (IN(1). EQ. -2) code returns to the calling program to allow a new VARB array to be set up so that more frames may be added to same plot tape
   b. Card 2/2 in format (7E10.4, 4X, A6) that specifies 7 real constants to be used in setting up the x- and y-array variables (read into the XIN array), and ICURVE; ICURVE is a six-letter word specifying the independent variable held constant when the curve(s) are being plotted. Normally this is the temperature.

```
00101                SUBROUTINE GRAPH
00101          C
00101          C     SUBROUTINE TO PLOT DIAPHANOUS,ANDIMX,DENSER,OR GOLEM-CALCULATED
00101          C     VALUES
00101          C
00101          C
00103                INTEGER OPN, TEMP, CHAR, HCHAR
00104                INTEGER GOLEM, DENSER, ANDIMX
00105                INTEGER GLAB
00105          C
00106                COMMON/CIA/VARB(1)
00107                COMMON/DCI1/IEND(100), NPTS(100), J2, NAME, GLAB(12), AA(12240)
00110                COMMON/DCI2/IN1, IN2, IN3, IN4, C1, C2, C3, C4, C5, C6, C7, C8,
00110               1          IDUMMY, JDUMMY, NGRID, NCHAR, ICON, NNTM
00111                COMMON/DCI3/NNGRID,KDUMM,IFLAG
00112                COMMON/PHSA/NFRAME, TESTT, SECRET(4), ANDIMX,IDANDI(12,5)
00112          C
00113                DIMENSION IN(4), OPN(15)
00114                DIMENSION  X(26,100), Y(26,100)
00115                DIMENSION XX(100), YY(100), NCHK(100), LABSAV(12)
00116                DIMENSION XLAB(12), YLAB(12), XIN(7), LABEL(54), CCURVE(26)
00117                DIMENSION CHAR(26), HCHAR(26), LCHAR(9)
00120                DIMENSION JCURVE(2), JABEL(26)
00121                DIMENSION C(8), VALS(100), ISCALE(2)
00121          C
00121          C
00121          C*    ITAPE IS THE PLOT OUTPUT TAPE, NORMALLY ON UNIT 16
00122                DATA ITAPE/16/
00124                DATA XDUM,NDUM/0.,682/
00127                DATA JCURVE/2*6H      /, LIN/3HLIN/, LOG/3HLOG/
00133                DATA YY1/1.0443638322/
00135                DATA X1/0.026787715/, DELTYI/0.013392857/
00140                DATA EPSILN/1.E-5/
00142                DATA JBLANK/6H      /, IVPLTD/-1/
00145                DATA DENSER / 6HDENSER /, GOLEM / 6H GOLEM /, ANDIMX / 6HANDIMX /
00151                DATA ITEMP/6H TEMP /
00153                DATA CHAR/17,18,19,20,21,22,23,24,25,33,34,35,36,37,38,39,40,41,
00153               1          50,51,52,53,54,55,56,57/
00155                DATA HCHAR/1HA, 1HB, 1HC, 1HD, 1HE, 1HF, 1HG, 1HH, 1HI, 1HJ, 1HK,
00155               1           1HL, 1HM, 1HN, 1HO, 1HP, 1HQ, 1HR, 1HS, 1HT, 1HU, 1HV,
00155               2           1HW, 1HX, 1HY, 1HZ/
00157                DATA LCHAR/    1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/
00157          C
00161                EQUIVALENCE (GLAB(1), ID(1))
00162                EQUIVALENCE (IN(1),IN1), (OPN(1),IDUMMY), (C(1),C1), (NCURVE,NNTM)
00163                EQUIVALENCE (XIN(5),CONSTX), (XIN(6),CONSTY) , (OPN(12), IPLOTT)
00164                EQUIVALENCE (XIN(7), CONST)
00164          C
00164          C*    SUBROUTINE ASSUMES THE FOLLOWING (ALL COMMENTS CONCERNING DIAPHA-
00164          C*      NOUS ARE APPLICABLE TO DENSER)
00164          C*      1.  VALUES ARE STORED IN ORDER OF DECREASING OR INCREASING VALUE
00164          C*          (IF POINTS ARE TO BE CONNECTED).
00164          C*      2.  DIAPHANOUS VALUES ARE STORED IN 10-WORD GROUPS, AS TEMPERA-
00164          C*          TURE VECTORS, IN ORDER OF DECREASING DENSITIES PER TEMPERA-
00164          C*          TURE.
00164          C*      3.  ANDIMX VALUES ARE STORED IN 10-WORD GROUPS, IN THE SAME
00164          C*          MANNER AS DIAPHANOUS
00164          C*      4.  GOLEM VALUES ARE STORED AS 12-WORD GROUPS, IN ANY MANNER
00164          C*          THE USER DESIRES, AS LONG AS ALL VALUES STORED CAN BE PLOT-
00164          C*          TED IN ORDER OF INCREASING OR DECREASING X OR Y VALUE (IF
00164          C*          POINTS ARE TO BE CONNECTED).
00164          C*      5.  THE FOLLOWING QUANTITIES ARE KNOWN
00164          C*          A)  IEND ARRAY, AN ARRAY CONTAINING THE LOCATIONS OF THE
00164          C*              LAST CELL USED TO STORE VALUES FOR A GIVEN CURVE
00164          C*              (E.G., THE LAST CELL USED AT A CONSTANT THETA, FOR
00164          C*              DIAPHANOUS).
00164          C*          B) NPTS ARRAY, AN ARRAY CONTAINING THE NUMBER OF X-Y POINTS
00164          C*              TO BE PLOTTED, PER GIVEN CONSTANT (COMPUTED AS NPTS(I)=
00164          C*              NPTS(I)/10 FOR DIAPHANOUS AND ANDIMX OUTPUT, AND NPTS(I)
00164          C*              = NPTS(I)/12 FOR GOLEM OUTPUT)
00164          C*          C) J2, THE NUMBER OF TEMPERATURE SETS STORED FOR PLOTTING
00164          C*          D) NAME, AN INTEGER VALUE IDENTIFYING THE SOURCE OF THE
00164          C*              DATA TO BE PLOTTED
00164          C*              1)  NAME = -1, DIAPHANOUS OUTPUT
00164          C*              2)  NAME = DENSER, CONDENSED DIAPHANOUS OUTPUT
00164          C*              3)  NAME = ANDIMX, ANDIMX OUTPUT
00164          C*              4)  NAME = GOLEM, GOLEM OUTPUT
00164          C           E) TRANS OR DYPER RUNS - AN IDENTIFYING TITLE TO BE PRINTED
00164          C*              AT THE TOP OF EACH GRAPH.
```

```
C
C*    INPUT IS AS FOLLOWS
C*      1) TWO CARDS CONTAINING THE FOLLOWING INFORMATION
C*         A) CARD 1/2 IN FORMAT (4(I2,1X), 6X, 15(I2,1X)) SPECIFYING
C*            ALL DATA NECESSARY TO PLOT VALUES.  (VALUES ARE READ INTO
C*            (IN(J), J=1,4) AND (OPN(JJ), JJ=1,15))
C*            1) IF (IN(1).EQ.0) ALL PLOTTING IS DONE.
C*            2) IF (IN(1).EQ.-2) CODE RETURNS TO THE CALLING PROGRAM
C*               TO ALLOW A NEW VARB ARRAY TO BE SET UP SO THAT MORE
C*               FRAMES MAY BE ADDED TO THE SAME PLOT TAPE.
C*         B) CARD 2/2 IN FORMAT (7E10.4,4X,A6) THAT SPECIFIES 7 REAL
C*            CONSTANTS TO BE USED IN SETTING UP THE X- AND Y-ARRAT
C*            VARIABLES (READ INTO THE XIN ARRAY), AND ICURVE.
C*            ICURVE IS A 6-LETTER WORD SPECIFYING THE INDEPENDENT
C*            VARIABLE OF WHICH THE CURVE(S) ARE BEING PLOTTED. NORMALLY
C*            THIS IS THE TEMPERATURE.
C*      3) A CARD IN FORMAT (12A6), CONTAINING TITLE INFORMATION USED
C*         AS A HEADING FOR EACH FRAME.  (MAY BE A BLANK CARD)
C*      4) TWO CARDS, EACH IN FORMAT 12A6, THAT SPECIFY THE APPROPRIATE
C*         LABELS FOR THE X- AND Y-AXES, RESPECTIVELY   (EITHER ONE
C*         OR BOTH CARDS MAY BE BLANK)
C
C***** D E S C R I P T I O N   O F   I N P U T                    *****
C*    THE IN ARRAY CONTROLS WHICH VARIABLES IN THE VARB ARRAY ARE TO
C*      BE USED FOR PLOTTING
C*      A) IN(1) AND IN(2) SPECIFY VARIABLES TO BE USED IN THE X-ARRAY,
C*         THE ARRAY CONTAINING THE ABSCISSAS OF POINTS TO BE PLOTTED.
C*      B) IN(3) AND IN(4) SPECIFY VARIABLES TO BE USED IN THE Y-ARRAY,
C*         THE ARRAY CONTAINING THE ORDINATES OF POINTS TO BE PLOTTED.
C
C*    IN(I)      SAUT VARIABLE      HUEBNER VARIABLE       GOLEM VARIABLE
C*    1          TK                 TK                     THETA(TK)
C*    2          GAMMA                                     RHO
C*    3          RHO                RHO                    P1 (PRESSURE)
C*    4          PRESHR                                    E (ENERGY)
C*    5          ENERGY                                    NBAR OR CAPAC
C*    6          EION                                      EIONIZ OR CAPAR
C*    7          KROS               THOPA                  CV
C*    8          KPLK               CROPA                  FEW (ZBAR)
C*    9          ZBAR               CAPNF(ZBAR)            PB1
C*    10         EGAM                                      ASB (SOUND SPEED)
C*    11                                                   EGAM
C*    12                                                   EGAM2 OR GAMMA
C
C*    THE OPN ARRAY CONTROLS VARIOUS OPTIONS USED IN PLOTTING
C*    OPN(1) DETERMINES HOW TO MANIPULATE THE VARIABLES TO BE SET UP
C*    FOR THE X-ARRAT
C*    OPN(2) DETERMINES HOW TO MANIPULATE THE VARIABLES TO BE SET UP
C*    FOR THE Y-ARRAT
C*
C*    OPN(I), I=1 OR 2    X OR Y ARRAY, J=1 OR 3 RESPECTIVELY
C*                         (ANY VARB ARRAY VARIABLE MAY BE EXPONENTIATED
C*                          BEFORE BEING OPERATED ON IN ONE OF THE FOL-
C*                          LOWING WAYS)
C*
C*
C*    1                    VARB(IN(J))
C*    2                    VARB(IN(J)) + XIN(J)
C*    3                    VARB(IN(J)) * XIN(J)
C*    4                    VARB(IN(J)) + VARB(IN(J+1))
C*    5                    (VARB(IN(J)) + VARB(IN(J+1))) + XIN(J)
C*    6                    (VARB(IN(J)) + VARB(IN(J+1))) * XIN(J)
C*    7                    VARB(IN(J) - VARB(IN(J+1))
C*    8                    (VARB(IN(J)) - VARB(IN(J+1))) + XIN(J)
C*    9                    (VARB(IN(J)) - VARB(IN(J+1))) * XIN(J)
C*    10                   VARB(IN(J)) * VARB(IN(J+1))
C*    11                   (VARB(IN(J)) * VARB(IN(J+1))) + XIN(J)
C*    12                   (VARB(IN(J)) * VARB(IN(J+1))) * XIN(J)
C*    13                   VARB(IN(J)) / VARB(IN(J+1))
C*    14                   (VARB(IN(J)) / VARB(IN(J+1))) + XIN(J)
C*    15                   (VARB(IN(J)) / VARB(IN(J+1))) * XIN(J)
C
C*    OPN(3) DETERMINES THE VALUE OF NGRID, THE TYPE OF GRID USED FOR
C*      PLOTTING
C*    TO GET TIC-MARKS ONLY (NO GRID LINES), ADD 4 TO THE VALUE OF NGRID
C*      NECESSARY TO OBTAIN THE TYPE OF GRID WANTED, AND INPUT THAT SUM
C*      FOR OPN(3).  **EXCEPTION - IF NGRID.LE.0, SUBTRACT 8 TO GET THE
C*      CODE TO SCALE WITH TIC-MARKS**
C*
C*    OPN(3)    X-AXIS         Y-AXIS
```

```
00164   C*   0      CODE SCALES     CODE SCALES
00164   C*   1      LINEAR          LINEAR
00164   C*   2      LOGARITHMIC     LINEAR
00164   C*   3      LINEAR          LOGARITHMIC
00164   C*   4      LOGARITHMIC     LOGARITHMIC
00164   C*   -1     LIN             CODE WILL SCALE
00164   C*   -2     LOG             CODE WILL SCALE
00164   C*   -3     CODE SCALES     LIN
00164   C*   -4     CODE SCALES     LOG
00164   C*
00164   C*   OPN(4) DETERMINES THE VALUE OF NCHAR, THE DECIMAL CODE OF THE
00164   C*     CHARACTER TO BE PLOTTED.  NORMAL VALUE IS 42, A PLOTTING DOT.
00164   C*     IF MORE THAN ONE CURVE PER FRAME.
00164   C*     1) IF (OPN(4).EQ.0), 'A' FOR THE FIRST CURVE, 'B' FOR THE SECOND
00164   C*        CURVE, ETC. (MAXIMUM OF 26 CURVES PER FRAME)
00164   C*     2) IF (OPN(4).LT.0), '1' FOR THE FIRST CURVE, '2' FOR THE SECOND
00164   C*        CURVE, ETC. (MAXIMUM OF 9 CURVES PER FRAME)
00164   C
00164   C*   OPN(5) DETERMINES THE VALUE OF ICON, THE OPTION FOR CONNECTING
00164   C*     POINTS WITH A LINE SEGMENT.
00164   C*     IF (ICON .EQ. 1) CONNECT POINTS
00164   C*     IF (ICON .EQ. 2) DO NOT CONNECT POINTS
00164   C
00164   C*   OPN(6) CONTROLS THE NUMBER OF PLOTS PER FRAME.
00164   C*   NOTE - **NO MORE THAN 18 CURVES MAY BE PUT ON ANY GIVEN FRAME**
00164   C
00164   C*   OPN(7) DETERMINES WHETHER LABELS WILL BE PRINTED ON THE PLOTS.
00164   C*     IF (OPN(7) .EQ. 0) PRINT LABELS ALONG THE TOP OF THE FRAME AND
00164   C*     ALONG THE X- AND Y-AXES (TO BE READ FROM THE THREE INPUT DATA
00164   C*     CAROS THAT FOLLOW, EACH IN FORMAT 12A6,AND USED TO LABEL THE TOP
00164   C*     OF THE FRAME, THE X-AXIS, AND THE Y-AXIS, RESPECTIVELY.
00164   C
00164   C*   IF (OPN(7) .LT. 0) PRINT A SUMMARY OF ALL THE CURVE LABELS AND
00164   C*        VALUES IN A BOX IN ONE CORNER (-1 FOR UPPER LEFT, -2 FOR UP-
00164   C*        PER RIGHT, -3 FOR LOWER LEFT, -4 FOR LOWER RIGHT)
00164   C
00164   C*   IF (OPN(7) .EQ. 1) USE THE DIAPHANOUS, DENSER, OR ANDINX ID RECORD
00164   C*     (READ BY OYPER OR TRANS) TO LABEL THE TOP OF THE GRAPHS, USING
00164   C*     THE NORMAL PRINOUT (NO BOX)
00164   C
00164   C*   TO USE THE ID RECORD READ BY TRANS OR OYPER, PLUS A BOX PRINTOUT,
00164   C*     SUBTRACT 4 FROM THE VALUE (AS SPECIFIED ABOVE) NECESSARY TO
00164   C*     INDICATE THE CORNER CHOSEN FOR PRINTING THE BOX.
00164   C
00164   C*   IF (OPN(7).EQ.2) DO NO PRINTING ON THE PLOTS
00164   C
00164   C*   OPN(8), OPN(9), OPN(10), AND OPN(11) DETERMINE WHETHER LOGARITHMS
00164   C*     (COMMON OR NATURAL) ARE TO BE TAKEN OF VARB(IN(J)), J=1 TO 4,
00164   C*     RESPECTIVELY, BEFORE THE X- AND Y-ARRAYS ARE SET UP.
00164   C*     A) NEGATIVE OPN(I),I=8,9,10,OR 11, MEANS USE NATURAL LOG OF
00164   C*        (VARB(J)**XIN(J), J=1,4), RESPECTIVELY.
00164   C*     B) POSITIVE OPN(I),I=8,9,10,OR 11, MEANS USE COMMON LOG OF
00164   C*        (VARB(J)**XIN(J), J=1,4), RESPECTIVELY.
00164   C
00164   C*   OPN(12)=IPLOTT, USED IF THETA CURVES ARE NOT BEING PLOTTED.  SPEC-
00164   C*     IFIES THE GENERAL CELL LOCATION OF THE CURVE VARIABLE (EX.,
00164   C*     IPLOTT=2 IF GAMMA CURVES ARE BEING PLOTTED FOR DIAPHANOUS)
00164   C
00164   C*   OPN(13) IS A QUANTITY INPUT IFF USER WISHES CODE TO SCALE EITHER
00164   C*     OR BOTH GRID AXES, USING A LIMITING VALUE DIFFERENT THAN 100
00164   C*     AS A DECIDING VALUE TO PLOT LOGARITHMICALLY, RATHER THAN
00164   C*     LINEARLY.
00164   C
00164   C
```

```
00164   C*     (OPN(J),J=14,15) FREE PARAMETERS
00164   C
00164   C*     (XIN(J),J=1,4) MAY BE USED TO EXPONENTIATE (VARB(IN(J)),J=1,4),
00164   C*       RESPECTIVELY, BEFORE THE X- AND Y-ARRAYS ARE SET UP   IF INPUT
00164   C*       AS ZERO, CODE SETS THEM TO ONE.
00164   C
00164   C*     XIN(5) AND XIN(6) ARE ADDITIVE OR MULTIPLICATIVE CONSTANTS USED TO
00164   C*       MODIFY VARB ARRAY VARIABLES CHOSEN FOR THE X- AND Y-ARRAYS,
00164   C*       RESPECTIVELY
00164   C
00164   C*     XIN(7) IS INPUT IFF OPN(12), I.E., IPLOTT, IS USED.  ALLOWS USER TO
00164   C*       INPUT A CONSTANT VALUE FOR PLOTTING ONE CURVE (EX., OPN(12)=2,
00164   C*       XIN(7)=100., TO PLOT A CURVE FOR GAMMA=100., IN DIAPHANOUS.)
00164   C
00164   C*     A NORMAL RUN SCALES THE GRID, USES ALPHABETIC CHARACTERS, CONNECTS
00164   C*       POINTS, AND PLOTS ALL CURVES ON ONE FRAME (MAXIMUM OF 26)
00164   C*     IF THE INPUT CARD CONTAINS ZEROES (BLANKS) FOR THE VARIABLES CON-
00164   C*       TROLLING THESE THINGS (OPN(3), OPN(4), OPN(6), ICURVE, RESPEC-
00164   C*       TIVELY), THE CODE WILL SET THE VALUES NECESSARY TO DO THEM.
00164   C
00165          LAST1=       IEND(J2)
00166          NCELLS=      10
00167            IF (NAME .EQ. GOLEM) NCELLS=12
00171          NSETS=       LAST1/NCELLS
00172          J2SAVE=      J2
00173          DO 10 NM=1,12
00176          LABSAV(NM)=  GLAB(NM)
00177       10 CONTINUE
00177   C
00201      502 CONTINUE
00201   C      READ INPUT CARDS SPECIFYING PLOTTING OPTIONS
00202          READ (5,1) (IN(J),J=1,4), (OPN(JJ),JJ=1,15), (XIN(JJJ),JJJ=1,7)
00202        1          ,ICURVE
00221        1 FORMAT (4(I2,1X), 6X, 15(I2,1X) / 7E10.4, 4X, A6)
00222            IF (IN(1).EQ.0 .AND. IVPLTD.GT.(-1)) GO TO 500
00224          WRITE (6,16) (IN(J),J=1,4), (OPN(JJ),JJ=1,15), (XIN(JJJ),JJJ=1,7)
00224        1          ,ICURVE
00243       16 FORMAT (17H1INPUT AS READ IS / 19H   IN ARRAY IS,3(I2,1H,1X), I2 /
00243        115H   OPN ARRAY IS , 14(I2,1H,1X), I2 / 15H   XIN ARRAY IS ,
00243        2  6(1PE12.4, 1H, 1X), 1PE12.4 / 12H0 ICURVE IS , A6)
00243   C
00243   C*     SET IN(1).EQ.0 TO FINISH PLOT TAPE
00243   C      IS IN(1) .EQ. 0? -'YES,NO'-
00244            IF (IN(1).EQ.0 .AND. IVPLTD.EQ.(-1)) GO TO 307
00246          IVPLTD=      IVPLTD + 1
00246   C
00246   C
00246   C*     SET IN(1).EQ.-2 TO RETURN TO THE MAIN PROGRAM TO COMPUTE NEW
00246   C*       VALUES FOR THE VARB ARRAY
00246   C      IS IN(1) .EQ. -2? -'YES,NO'-
00247            IF (IN(1) .EQ. -2) GO TO 503
00247   C
00247   C
00247   C      HAS OPN(1) BEEN INPUT INCORRECTLY?-'YES,NO'-
00251            IF (OPN(1).LE.0 .OR. OPN(1).GE.16) GO TO 499
00251   C      HAS OPN(2) BEEN INPUT INCORRECTLY?-'YES,NO'-
00253            IF (OPN(2).LE.0 .OR. OPN(2).GE.16) GO TO 498
00253   C
00253   C      HAS OPN(7) BEEN INPUT INCORRECTLY? -'YES,NO'-
00255            IF (OPN(7) .GT. 2) GO TO 498
00257          DO 22 K5=1,LAST1
00262          AA(K5)=      VARB(K5)
00263       22 CONTINUE
00265          J2=          J2SAVE
00265   C      READ TITLE CARD
00265   C
00266          LABOLD=      OPN(7) + 4
00267            IF (OPN(7) .LT. (-4)) OPN(7)=LABOLD
00271          READ (5,2) (GLAB(I),I=1,12)
00277        2 FORMAT (12A6)
00300       28 CONTINUE
00301          WRITE (6,5) (GLAB(I), I=1,12)
00307        5 FORMAT (1X,12A6)
00310       27 CONTINUE
00311          READ (5,2) (XLAB(I),I=1,12), (YLAB(I),I=1,12)
00323          WRITE (6,5) (XLAB(I),I=1,12), (YLAB(I),I=1,12)
00335            IF (OPN(7).NE.1 .AND.LABOLD.GT.0) GO TO 29
00337          DO 75 J5=1,12
00342          GLAB(J5)=    LABSAV(J5)
00343       75 CONTINUE
00343   C
```

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00345        29 CONTINUE
00345    C
00345    C      SET UP PLOTTING OPTIONS
00345    C
00346             IF (NGRID .GT. 8) GO TO 496
00346    C
00350          NNGRID=       0
00351             IF (NGRID .GT. 4) NNGRID=NGRID - 4
00353             IF (NGRID .LT. (-4)) NNGRID=NGRID+5
00353    C
00355             IF (NNGRID.NE. 0) NGRID=NNGRID
00355    C
00357             IF (NGRID.GT. 0 .OR. NGRID.LT.(-4)) GO TO 55
00361             IF (NGRID .EQ. (-1)) ISCALE(1)=LIN
00363             IF (NGRID .EQ. (-2)) ISCALE(1)=LOG
00365             IF (NGRID .EQ. (-3)) ISCALE(2)=LIN
00367             IF (NGRID .EQ. (-4)) ISCALE(2)=LOG
00371        55 CONTINUE
00371    C
00372             IF (NCHAR.EQ.0 .AND. NNTM.EQ.1) NCHAR=42
00374             IF (ICON .EQ. 0) ICON = 1
00376             IF (ICON.LT.1 .OR. ICON.GT.2) GO TO 495
00400             IF (NNTM.GT.J2 .OR. NNTM.GT.18) GO TO 494
00402             IF (NNTM .EQ. 0) NNTM=J2
00404             IF (IPLOTT .EQ. 0) IPLOTT=1
00406             IF (ICURVE .EQ. JBLANK) ICURVE = ITEMP
00410          GSCALE=      100.
00411             IF (OPN(13) .NE. 0) GSCALE=OPN(13)
00413          JCURVE(1)=   ICURVE
00413    C
00413    C      DETERMINE VALUES OF COEFFICIENTS NECESSARY TO SET UP PLOTTING
00413    C    1  VARIABLES
00413    C
00414          DO 18 JKK=1,8
00417          C(JKK)=       1.
00420        18 CONTINUE
00422          KK=           1
00423          DO 20 K=1,2
00426             IF (OPN(K).LE.3 .OR. OPN(K).GE.10) C(KK)=0.
00430             IF (OPN(K).GE.7 .AND. OPN(K).LE.9) C(KK)=-1.
00432             IF (OPN(K) .LE. 9) C(KK+1)=0.
00434             IF (OPN(K) .GE. 13) C(KK+1)=-1.
00436             IF (MOD(OPN(K),3) .NE. 0) C(KK+2)=0.
00440             IF (MOD(OPN(K)-1,3).EQ.0 .OR. MOD(OPN(K),3).EQ.0) C(KK+3)=0.
00442          KK=           5
00443        20 CONTINUE
00445          WRITE (6,15) (C(I), I=1,8)
00453        15 FORMAT (12H0C ARRAY IS , 7(F4.1,2H, ), F4.1)
00454        17 FORMAT (1H1)
00454    C
00454    C
00454    C
00455             IF (ABS(CONSTX) .LT. 1,E-37) CONSTX=1.
00457             IF (ABS(CONSTY) .LT. 1,E-37) CONSTY=1.
00457    C
00461          WRITE (6,25) (IN(J),J=1,4), (OPN(JJ),JJ=1,15), (XIN(JJJ),JJJ=1,8),
00461        1                ICURVE
00500          WRITE (6,5) (GLAB(I),I=1,12),(XLAB(I),I=1,12), (YLAB(I),I=1,12)
00516       25 FORMAT (17H0INPUT AS USED IS / 14H   IN ARRAY IS,3(I2,1H,1X), I2/
00516        115H   OPN ARRAY IS , 14(I2,1H,1X), I2 / 15H   XIN ARRAY IS ,
00516        2  5(1PE12.4, 1H, 1X), 1PE12.4 / 13H   ICURVE IS , A6)
00517             IF (IPLOTT .EQ. 1) GO TO 750
00521          CALL SEQ(AA, NSETS, NCELLS, IPLOTT, VALS, NVALS)
00522          NROWE=        0
00523          DO 749 JL=1,NVALS
00526          NROWB=        NROWE + 1
00527          CALL SERCH(VALS(JL), IPLOTT, AA, NSETS, NCELLS, NPTS(JL), NROWB,
00527        1             NROWE)
00530          IEND(JL)=     NROWE + NCELLS
00531          WRITE (6,1005) JL, VALS(JL), NPTS(JL), NROWB, NROWE
00540     1005 FORMAT (I4, E15.8, I6, I6, I6)
00541      749 CONTINUE
00543             IF (NNTM.EQ.J2 .AND. NVALS.NE.J2) NNTM=NVALS
00545             IF (NVALS .LT. NNTM)  NNTM=NVALS
00547             IF (NNTM .GT. 18) NNTM=18
00551          J2=           NVALS
00552      750 CONTINUE
00552    C
00552    C*     USE (XIN(JJ),JJ=1,4) TO EXPONENTIATE (VARB(IN(JJ)), JJ=1,4),
00552    C*       RESPECTIVELY.
00553             IF (ABS(XIN(1)).LT.1.E-37 .AND. ABS(XIN(2)).LT.1.E-37 .AND.
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00553        1      ABS(XIN(3)).LT.1.E-37 .AND. ABS(XIN(4)).LT.1.E-37) GO TO 72
00555          IF (IN2 .EQ. 0) IN2=1
00557          IF (IN4 .EQ. 0) IN4=1
00561        DO 71 KK6=1,NSETS
00564        K6=          (KK6-1) * NCELLS
00565          IF (ABS(XIN(1)) .GT. 1,E-37) AA(K6+IN1)=AA(K6+IN1)**XIN(1)
00567          IF (ABS(XIN(2)) .GT. 1,E-37) AA(K6+IN2)=AA(K6+IN2)**XIN(2)
00571          IF (ABS(XIN(3)) .GT. 1,E-37) AA(K6+IN3)=AA(K6+IN3)**XIN(3)
00573          IF (ABS(XIN(4)) .GT. 1,E-37) AA(K6+IN4)=AA(K6+IN4)**XIN(4)
00575     71 CONTINUE
00577     72 CONTINUE
00577  C
00600        DO 64 K4=8,11
00603          IF (OPN(K4) .EQ. 0) GO TO 65
00605        DO 69 KK5=1,NSETS
00610        K5=            (KK5-1) * NCELLS
00611        INN=           IN(K4-7)
00612          IF (OPN(K4   ) .LT. 0) GO TO 67
00614        AA(INN+K5)=  ALOG10(AA(INN+K5))
00615        GO TO 68
00616     67 CONTINUE
00617        AA(INN+K5)=  ALOG(AA(INN+K5))
00620     68 CONTINUE
00621     69 CONTINUE
00623     65 CONTINUE
00624     64 CONTINUE
00624  C
00624  C
00624  C
00624  C     MAKE INITIAL CALL TO SETUP
00626          IF (IVPLTD .GT. 0) GO TO 33
00630        NFRAME=        3
00631        CALL SETUP(XDUM, NDUM, ITAPE)
00631  C
00631  C     PLOT INITIAL FRAME CONTAINING TITLE INFORMATION
00632        CALL FRAME (0.0, 1.0, 1.0, 0.0)
00632  C     IS PLOT DATA FROM ANDIMX? -'YES,NO,-
00633          IF (OPN(7) .EQ. 2) GO TO 32
00635          IF (NAME .EQ. ANDIMX) GO TO 30
00637        CALL TSP(0.2, 0.5, ID, 72)
00640        GO TO 32
00640  C
00641     30 CONTINUE
00642        DO 31 J4=1,5
00645        YTYP=          0.56 - FLOAT(J4) * 0.04
00646        CALL TSP( 0.2, YTYP, IDANDI(1,J4), 72)
00647     31 CONTINUE
00651        CALL TSP(0.42, 0.6, SECRET, 20)
00652     32 CONTINUE
00653        CALL ADF
00654        NFRAME=        NFRAME + 1
00655     33 CONTINUE
00655  C
00655  C     SET UP ARRAYS OF POINTS, PER CONSTANT, TO BE PLOTTED
```

```
      ISTART=         0
      NTM1=           1
      LCURVE=         J2 - NNTM * (J2/NNTM)
      NNFRAM=         (J2 + NNTM - 1)/NNTM
      DO 60 J3=1,NNFRAM
        IF (J3.EQ.NNFRAM .AND. LCURVE.NE.0) NCURVE = LCURVE
C
C     SET UP X- AND Y- ARRAYS NECESSARY FOR PLOTTING EACH GRAPH
      DO 41 KK2=1,NCURVE
      NNPTS=          NPTS(NTM1)
      NTM1=           NTM1 + 1
      CCURVE(KK2)=  AA(ISTART + IPLOTT)
C
      NGOOD=          1
      NFGP=           0
      DO 42 KL=1,NNPTS
      NCHK(KL)=       0
   42 CONTINUE
C
      DO 40 KK1=1,NNPTS
      K1=             ISTART + NCELLS * (KK1 - 1)
      X(KK2,KK1)=  ( AA(K1+IN1) + C1*AA(K1+IN2)) * (    AA(K1+IN2)**C2)
     1              * (CONSTX**C3) + (C4 * CONSTX)
      Y(KK2,KK1)=  (AA(K1+IN3) + C5*AA(K1+IN4)) * (    AA(K1+IN4)**C6)
     1              * (CONSTY**C7) + (C8 * CONSTY)
        IF (NGRID .EQ. 1) GO TO 48
        IF (X(KK2,KK1).LT.1.E-37 .AND. (NGRID.EQ.2 .OR. NGRID.EQ.4 .OR.
     1        NGRID.EQ.(-2) .OR. NGRID.EQ.(-5))) NCHK(KK1)=1
        IF (Y(KK2,KK1).LT.1.E-37 .AND. (NGRID.EQ.3 .OR. NGRID.EQ.4 .OR.
     1        NGRID.EQ.(-4) .OR. NGRID.EQ.(-5))) NCHK(KK1)=1
        IF (NCHK(KK1) .EQ. 1) NGOOD=2
        IF (NFGP.EQ.0 .AND. NCHK(KK1).EQ.0) NFGP=KK1
   48 CONTINUE
   40 CONTINUE
      ISTART=         IEND(NTM1 - 1)
C
      GO TO (43.44), NGOOD
   44 CONTINUE
C
        IF (NFGP .EQ. 1) GO TO 45
      DO 46 JM=NFGP,1,-1
      WRITE (6,1000) X(KK2,JM), Y(KK2,JM) , X(KK2,NFGP), Y(KK2,NFGP)
 1000 FORMAT (53H0***WARNING*** A NEGATIVE VALUE HAS BEEN FOUND.  X = ,
     1        1PE14.8, 6H, Y = , 1PE14.8,  / 19H X IS BEING SET TO ,
     2        1PE14.8, 20H, Y IS BEING SET TO , 1PE14.8 //)
      X(KK2,JM)=   X(KK2,NFGP)
      Y(KK2,JM)=   Y(KK2,NFGP)
      NCHK(JM)=    0
   46 CONTINUE
   45 CONTINUE
C
      DO 47 KM=NFGP,NNPTS
        IF (NCHK(KM) .NE. 1) GO TO 747
      WRITE (6,1000) X(KK2,KM), Y(KK2,KM) , X(KK2,KM-1), Y(KK2,KM-1)
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```
00770              X(KK2,KM)=    X(KK2,KM-1)
00771              Y(KK2,KM)=    Y(KK2,KM-1)
00772          747 CONTINUE
00773           47 CONTINUE
00775           43 CONTINUE
00776           41 CONTINUE
00776     C
00776     C        SET UP XMIN, XMAX, YMIN, AND YMAX
01000              XMIN=         X(1,1)
01001              XMAX=         X(1,1)
01002              YMIN=         Y(1,1)
01003              YMAX=         Y(1,1)
01003     C
01003     C        FIND THE MINIMA AND MAXIMA OF THE X- AND Y-ARRAYS
01004              NTM3=         NTM1 - NCURVE
01005              DO 80 K2=1,NCURVE
01010              NNPTS=        NPTS(NTM3)
01011              NTM3=         NTM3 + 1
01012              DO 80 L2=1,NNPTS
01015              XMIN=         AMIN1(XMIN, X(K2,L2))
01016              XMAX=         AMAX1(XMAX, X(K2,L2))
01017              YMIN=         AMIN1(YMIN, Y(K2,L2))
01020              YMAX=         AMAX1(YMAX, Y(K2,L2))
01021           80 CONTINUE
01021     C
01024              XMIN=         XMIN * .99
01025              YMIN=         YMIN * .99
01026              XMAX=         XMAX * 1.01
01027              YMAX=         YMAX * 1.01
01030              WRITE (6,14) J3, XMIN, XMAX, YMIN, YMAX
01037           14 FORMAT (/////11H0FOR FRAME ,I4,9H, XMIN = ,1PE14.8,9H, XMAX = ,
01037            1          E14.8,9H, YMIN = ,E14.8,9H, YMAX = ,E14.8)
01037     C
01040                IF (NGRID .GT. 0) GO TO 85
01042                IF (NGRID.LT.0 .AND. NGRID.GT.(-3)) GO TO 82
01042     C
01042     C        SCALE X
01044              XSCALE=       ABS(XMAX/XMIN)
01046              ISCALE(1)=    LIN
01046                IF (XSCALE .GT. GSCALE) ISCALE(1)= LOG
01050                IF (NGRID .NE. 0) GO TO 83
01052           82 CONTINUE
01052     C
01052     C        SCALE Y
01053              YSCALE=       ABS(YMAX/YMIN)
01054              ISCALE(2)=    LIN
01055                IF (YSCALE .GT. GSCALE) ISCALE(2)= LOG
01057           83 CONTINUE
01060                IF (ISCALE(1) .EQ. LOG) GO TO 84
01062              NGRID=        1
01063                IF (ISCALE(2) .EQ. LOG) NGRID= 3
01065              GO TO 81
01066           84 CONTINUE
01067              NGRID=        2
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01070          IF (ISCALE(2) .EQ. LOG) NGRID=4
01072       81 CONTINUE
01073          WRITE (6,1010) NGRID, (ISCALE(I),I=1,2)
01102     1010 FORMAT (33H CODE HAS SCALED GRID.  NGRID IS ,I3, 12H, SCALE WAS ,
01102         1     A3,1H-,A3)
01103       85 CONTINUE
01104          NTM=         1
01105          NTM2=        NTM1 - NCURVE
01106          DO 52 JJ4=1,NCURVE
01106    C
01111            IF (OPN(4) .LT. 1) JCHAR=LCHAR(JJ4)
01113            IF (NCURVE.GT.1 .AND. OPN(4).EQ.0) JCHAR=HCHAR(JJ4)
01115          NNPTS=       NPTS(NTM2)
01116          DO 53 JJ=1,NNPTS
01121          XX(JJ)=      X(JJ4,JJ)
01122          YY(JJ)=      Y(JJ4,JJ)
01123       53 CONTINUE
01123    C
01125          CALL SORT(XX,YY,NNPTS)
01126            IF (NTM.EQ.1) WRITE (6,1007)
01131          WRITE (6,19) JCHAR, ICURVE, CCURVE(JJ4)
01136       19 FORMAT (7H CURVE ,A1,12H, ICURVE IS ,A6, 1H=,1PE15.6,21H, X AND Y
01136         1ARRAYS ARE )
01137     1007 FORMAT (49H0ARRAYS TO BE PLOTTED HAVE BEEN SORTED AS FOLLOWS  /)
01140          WRITE (6,1006) (I, XX(I), YY(I), I=1,NNPTS)
01150     1006 FORMAT (3(6X,I5,1X,1P2E15.8))
01150    C     PLOT GIVEN SETS, PER CONSTANT.
01150    C     CALL PLOTV
01150    C
01151          NNCHAR=      NCHAR
01152            IF (NCURVE.GT.1 .AND. NCURVE.LT.10 .AND. OPN(4).LT.0)NNCHAR=JJ4
01154            IF(NCURVE.GT.1 .AND. OPN(4).EQ.0) NNCHAR=CHAR(JJ4)
01156          CALL PLOTV(NTM, NGRID, NNCHAR, ICON, NPTS(NTM2), XX, YY, XMIN,
01156         1      XMAX, YMIN, YMAX, XLAB, YLAB, GLAB)
01157            IF (OPN(7) .EQ. 2) GO TO 301
01161          DO 300 L=1,54
01164          LABEL(L)=    JBLANK
01165      300 CONTINUE
01167          MCHAR=       NNCHAR
01170           IF(NCURVE.GT.1.AND.NCURVE.LT.10.AND.OPN(4).LT.0) MCHAR=LCHAR(JJ4)
01172            IF (NCURVE.GT.1 .AND. OPN(4).EQ.0) MCHAR=HCHAR(JJ4)
01174            IF (OPN(7).EQ.0 .OR. OPN(7).EQ.1) GO TO 91
01176          JABEL(JJ4)=  MCHAR
01177          GO TO 301
01200       91 CONTINUE
01201          LABEL(JJ4*3-2)=   ICURVE
01202            IF (NCURVE .LE. 3) GO TO 302
01204          CALL PRINT(MCHAR, CCURVE(JJ4), LABEL(JJ4*3-1))
01205            IF (NTM .EQ. 1) Y1= YT1
01207            IF (JJ4.LE.6) CALL TSP(X1,Y1,LABEL,108)
01211            IF (JJ4.EQ.7 .OR. JJ4.EQ.13) Y1= Y1 - DELTY1
01213            IF(JJ4.GE.7.AND.JJ4.LE.12) CALL TSP(X1,Y1,LABEL(19),108)
01215            IF(JJ4.GE.13) CALL TSP(X1,Y1,LABEL(37),108)
01217          GO TO 303
01220      302 CONTINUE
01221          CALL RITE(0.02232343, 1.02679, 1.0, 90, 72, 1, LABEL)
01222      303 CONTINUE
01223      301 CONTINUE
01224          NTM=         2
01225          NTM2=        NTM2 + 1
01226       52 CONTINUE
01230          X2=          OPN(7)
01231            IF (OPN(7).LT.0) CALL BOX(X2,DUM,NCURVE,CCURVE,YY,JCURVE,JABEL)
01233          NFRAME=      NFRAME + 1
01234       60 CONTINUE
01236          GO TO 502
01236    C
01237      500 CONTINUE
01237    C     PLOT FINAL FRAME CONTAINING TITLE INFORMATION
01240          CALL ADF
01241          NFRAME=      NFRAME + 1
01242          CALL FRAME (0.0, 1.0, 1.0, 0.0)
01243            IF (OPN(7) .EQ. 2) GO TO 63
01243    C     IS PLOT DATA FROM ANOIMX? -'YES,NO,-
01245            IF (NAME .EQ. ANOIMX) GO TO 61
01247          CALL TSP(0.2, 0.5, ID, 72)
01250          GO TO 63
01251       61 CONTINUE
01252          DO 62 J4=1,5
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01255         YTYP=        0.56 - FLOAT(J4) * 0.04
01256         CALL TSP( 0.2, YTYP, IDANDI(1,J4), 72)
01257      62 CONTINUE
01261         CALL TSP(0.42, 0.6, SECRET, 20)
01262      63 CONTINUE
01263         CALL ADF
01264         NFRAME=      NFRAME + 1
01264   C
01264   C     MAKE CALL TO FINISH TO END PLOTTING
01265         CALL FINISH
01266         IFLAG=       2
01266   C
01267     503 CONTINUE
01267   C     WRITE SUCCESSFUL COMPLETION STATEMENT
01270           IF (NAME.EQ.GOLEM) WRITE (6,1006) (VARB(JK),JK=1,LAST1)
01277    1006 FORMAT (44H1SUBROUTINE GRAPH HAS EXECUTED SUCCESSFULLY. / 16H VARB
01277        1 ARRAY WAS  / (1P12E10.3))
01300           IF (NAME.NE.GOLEM) WRITE (6,3) (VARB(JK),JK=1,LAST1)
01307       3 FORMAT ( 44H1SUBROUTINE GRAPH HAS EXECUTED SUCCESSFULLY. / 16H VAR
01307        1B ARRAY WAS  // (1P10E12.5))
01310           IF (IN(1) .EQ. -2) GO TO 506
01310   C
01312     501 CONTINUE
01313         WRITE (6,17)
01315         WRITE (6,4) ITAPE, NFRAME
01321         WRITE (6,4) ITAPE, NFRAME
01323       4 FORMAT (31H PLOTTING IS COMPLETED ON UNIT , I4, 10H THERE ARE, I5
01323        1 ,50H FRAMES.  PLEASE NOTE THIS ON PLOT LABEL, IF THERE IS ONE.)
01326     505 CONTINUE
01327         RETURN
01327   C
01330     506 CONTINUE
01330   C     ZERO-OUT VARB ARRAY BEFORE RETURNING TO MAIN PROGRAM
01331         DO 504 JK=1,LAST1
01334         VARB(JK)=    0.
01335     504 CONTINUE
01337         IFLAG=       1
01340         GO TO 505
01340   C
01340   C     E R R O R   E X I T S
01340   C
01341     494 CONTINUE
01342         WRITE (6,13) OPN(6)
01345      13 FORMAT (46H1OPN(6) HAS BEEN INPUT INCORRECTLY.  OPN(6) = ,I4)
01346         GO TO 507
01347     495 CONTINUE
01350         WRITE (6,12) OPN(5)
01353      12 FORMAT (46H1OPN(5) HAS BEEN INPUT INCORRECTLY.  OPN(5) = ,I4)
01354         GO TO 507
01355     496 CONTINUE
01356         WRITE (6,9) OPN(3)
01361       9 FORMAT (46H1OPN(3) HAS BEEN INPUT INCORRECTLY.  OPN(3) = ,I4)
01362         GO TO 507
01363     497 CONTINUE
01364         WRITE (6,8) OPN(7)
01367       8 FORMAT (46H1OPN(7) HAS BEEN INPUT INCORRECTLY.  OPN(7) = ,I4)
01370         GO TO 507
01371     498 CONTINUE
01372         WRITE (6,7) OPN(2)
01375       7 FORMAT (46H1OPN(2) HAS BEEN INPUT INCORRECTLY.  OPN(2) = ,I4)
01376         GO TO 507
01377     499 CONTINUE
01400         WRITE (6,6) OPN(1)
01403       6 FORMAT (46H1OPN(1) HAS BEEN INPUT INCORRECTLY.  OPN(1) = ,I4)
01404         GO TO 506
01405     507 CONTINUE
01406         CALL MERR
01407         END
```

2. A card in format (12A6), containing title information used as a heading for each frame (may be a blank card)
3. Two cards, each in format 12A6, that specify the appropriate labels for the x- and y-axes, respectively (either one or both cards may be blank)

DESCRIPTION OF INPUT

The IN array controls which variables in the VARB array are to be used for plotting:

1. IN(1) and IN(2) specify variables to be used in the x-array, the array containing abscissas of points to be plotted
2. IN(3) and IN(4) specify variables to be used in the y-array, the array containing the ordinates of points to be plotted

IN(I)	SADY variable	Huebner variable	GOLEM variable
1	TK	TK	THETA (TK)
2	GAMMA		RHO
3	RHO	RHO	P1 (pressure)
4	PRESHR		E (energy)
5	ENERGY		NBAR or CAPAC
6	EION		EIONIZ or CAPAR
7	KROS	TROPA	CV
8	KPLK	CROPA	FEW (ZBAR)
9	ZBAR	CAPNF(ZBAR)	PB1
10	EGAM		ASQ (sound speed)
11			EGAM
12			EGAM2 or GAMMA

The OPN array controls various options used in plotting. OPN(1) determines how to manipulate variables to be set up for the x-array. OPN(2) determines how to manipulate variables to be set up for the y-array.

OPN(I), I=1 or 2		x- or y-array, J=1 or 3 respectively. (Any VARB array variable may be exponentiated or be replaced by its common or natural logarithm before being operated on in one of the following ways.) XIN(L), (L=5, 6), is discussed below.
	1	VARB(IN(J))
	2	VARB(IN(J)) + XIN(L)
	3	VARB(IN(J)) * XIN(L)
	4	VARB(IN(J)) + VARB(IN(J+1))
	5	(VARB(IN(J)) + VARB(IN(J+1))) + XIN(L)
	6	(VARB(IN(J)) + VARB(IN(J+1))) * XIN(L)
	7	VARB(IN(J)) - VARB(IN(J+1))
	8	(VARB(IN(J)) - VARB(IN(J+1))) + XIN(L)
	9	(VARB(IN(J)) - VARB(IN(J+1))) * XIN(L)
	10	VARB(IN(J)) * VARB(IN(J+1))
	11	(VARB(IN(J)) * VARB(IN(J+1))) + XIN(L)
	12	(VARB(IN(J)) * VARB(IN(J+1))) * XIN(L)
	13	VARB(IN(J)) / VARB(IN(J+1))
	14	(VARB(IN(J)) / VARB(IN(J+1))) + XIN(L)
	15	(VARB(IN(J)) / VARB(IN(J+1))) * XIN(L)

OPN(3) determines value of NGRID, the type of grid used for plotting. To get tick marks only (no grid lines), add 4 to value of NGRID necessary to obtain the type of grid wanted, and input that sum for OPN(3). An exception is if NGRID. LE. 0; then subtract 5 to get the code to scale with tick marks.

OPN(3)	x-axis	y-axis
0	Code scales	Code scales
1	Linear	Linear
2	Logarithmic	Linear
3	Linear	Logarithmic
4	Logarithmic	Logarithmic
-1	Linear	Code will scale
-2	Logarithmic	Code will scale
-3	Code scales	Linear
-4	Code scales	Logarithmic

OPN(4) determines value of NCHAR, the decimal code of the character to be plotted. Normal value is 42, a plotting dot. If more than one curve per frame:

1. If (OPN(4).EQ. 0), 'A' for first curve, 'B' for second curve, etc. (maximum of 18 curves per frame)
2. If (OPN(4).LT. 0), '1' for first curve, '2' for second curve, etc. (maximum of 9 curves per frame)

OPN(5) determines the value of ICON, the option for connecting points with a line segment. If (ICON .EQ. 1), connect points. If (ICON .EQ. 2), do not connect points.

OPN(6) controls number of plots per frame. Note that no more than 18 curves may be put on any given frame.

OPN(7) determines whether labels will be printed on plots. If (OPN(7) .EQ. 0), print labels along top of frame and along x- and y-axes (to be read from three input data cards that follow, each in format 12A6, and used to label top of frame, the x-axis, and the y-axis, respectively).

If (OPN(7) .LT. 0), print a summary of all curve labels and values in a box in one corner (-1 for upper left, -2 for upper right, -3 for lower left, -4 for lower right).

If (OPN(7) .EQ. 1), use DIAPHANOUS, DENSER, GOLEM or ANDIMX ID record (read by DYPER4 or TRANS) to label top of the graphs, using normal printout (no box).

To use ID record read by TRANS or DYPER4 plus a box printout, subtract 4 from value (as specified above) necessary to indicate corner chosen for printing the box.

If (OPN(7) .EQ. 2), do not print on the plots.

OPN(8), OPN(9), OPN(10), and OPN(11) determine whether logarithms (common or natural) are to be taken of (VARB(IN(J)), J=1 to 4), respectively,

before the x- and y-arrays are set up.

a. Negative OPN(I), I=8, 9, 10, or 11, means use natural log of (VARB(J)**XIN(J), J=1, 4), respectively.

b. Positive OPN(I), I=8, 9, 10, or 11, means use common log of (VARB(J)**XIN(J), J=1, 4), respectively.

OPN(12)=IPLOTT, used if THETA curves are not being plotted. Specifies the general cell location of the variable being held constant on each curve (e.g., IPLOTT=2 if gamma curves are being plotted for DIAPHANOUS).

OPN(13) is an input quantity if user wishes code to scale either or both grid axes, using a limiting value different than 100 as a deciding value to plot logarithmically, rather than linearly.

(OPN(J), J=14, 15) free parameters

(XIN(J), J=1, 4) may be used to exponentiate (VARB(IN(J)), J=1, 4), respectively, before the x- and y-arrays are set up. If input as zero, code does not use them.

XIN(5) and XIN(6) are additive or multiplicative constants used to modify VARB array variables chosen for the x- and y-arrays, respectively.

XIN(7) is input if OPN(12), I.E., IPLOTT, is used. Allows user to input a constant value for plotting one curve (e.g., OPN(12)=2, XIN(7)=100., to plot a curve for gamma = 100., in DIAPHANOUS.)

To use the GRAPH subprogram, mount one output (plot) tape on logical unit 16 and specify that it be written with a tape-density of 556 BPI.

GRAPH uses the General Atomic SC-4020 plotting routines discussed in Ref. 12.

TRANS: A PLOTTING PROGRAM ADJUNCT

The TRANS program and its associated subroutines, INPUT, INPUTG, DAR, and ARGE, were coded to read output data cards punched by programs DYPER4 or GOLEM and fill a one-dimensional array of regularly spaced quantities for subroutine GRAPH.

```
@IT FOR,* TRANS/SI021
COMPILATION BY UNIVAC 1108 FORTRAN-IV DATED     11 NOV 1966 F4008
THIS COMPILATION WAS DONE ON 01 NOV 67 AT 14:54:10

00101              COMMON/C1A/VARB(5000)
00103              COMMON/DC11/IEND(100),MPTS(100),NPTS(100),J2,NAME,GLAB(12)
00104              CALL INPUT (GLAB,VARB,NROW,NCOL,NPTS,J2)
00105              N=NCOL*NROW
00106              NAMES=1
00107              NSUM=0
00110              DO 10 I=1,J2
00113              MPTS(I)=NCOL*NPTS(I)
00114              IEND(I)=MPTS(I)+NSUM
00115           10 NSUM=MPTS(I)+NSUM
00117              CALL GRAPH
00120              CALL EXIT
00121              END
```

Input for TRANS

CARD NO.	COLUMNS	FORMAT	VARIABLE NAME	MEANING
1	1-6	A6	Name	If (NAME. EQ. SADY), DIAPHANOUS output data cards (punched by program DYPER4) follow. If (NAME. EQ. GOLEM), GOLEM output data cards (punched by program GOLEM) follow
1A	1-72	12A6	(FMT(I), I= 1, 12)	If (NAME. EQ. SADY), this card is not used. If (NAME. EQ. GOLEM), specifies the format with which the GOLEM output data cards are to be read
	76	I1	IWRIT1	If (IWRIT1. EQ. 0), no printout If (IWRIT1. EQ. 1), input cards and array as set up for GRAPH will be printed
	79-80	I2	ITEMS	Specifies the number of items to be read from each GOLEM output data card
2	1-72	12A6	(ID(I), I=1, 12)	72 columns of identification information
3, . . . , N	Variable	Variable	Variable	Contain the data that are used to fill the array for use by GRAPH
N+1	Variable	Variable	Variable	If the first word on the card is $\leq$ 0., it signifies end of DYPER4 or GOLEM output data cards

DENSER: A DIAPHANOUS TAPE COMPRESSOR CODE

The DENSER program was written to pack the data on DIAPHANOUS tapes so that more data could be written onto one tape. It is in FORTRAN IV language.

DENSER can read a number of DIAPHANOUS binary tapes and condense these onto one card-image tape file which can be read on most computers. The card-image tape is written in even parity at 556 BPI in IBM-compatible

```
      PROGRAM DENSER(INPUT,OUTPUT,TAPE10,TAPE9,TAPE5=INPUT,TAPE6=OUTPUT)
C
C     DIAPHANOUS EDITOR
C*    ALL DENSER RUNS MUST WRITE ON A TAPE IN EVEN PARITY -
C*    THIS IS DONE BY SPECIFYING THE K AND E OPTIONS ON THE TAPE ASSIGN CARD
C     DAPHNE WAS ORIGINALLY MODIFIED BY L. R. NORRIS TO READ A DIAPHANOUS
C     TAPE AND MAKE THIS INTO A CONDENSED TAPE IN ORDER TO SAVE SPACE
C
C     VARIABLE NAME  MEANING
C
C     *** AUGEAS ***
C     DELEPJ (2000)  ENERGY CHANGE DURING A TRANSITION (EV)
C     DELEPS (1500)  IONIZATION POTENTIAL OF A STATE (EV)
C     EIN (15)       ENERGY OF GROUND STATE OF AN IONIZATION LEVEL
C     EPSO (1500)    SAME AS EPS IN DIAPHANOUS
C     FPC (5, 5, 5)  FRACTIONAL PERCENTAGE COEFFICIENT FOR TRANSITION BETWEEN
C                    SPLIT CONFIGURATIONS
C     IJD (2000)     IDENTIFICATION NUMBER OF INITIAL STATE ASSOCIATED WITH A
C                    TRANSITION
C     ISPLIT (15, 40)IDENTIFICATION OF A SPLIT CONFIGURATION
C     MERGED (15, 40)TRUE IF THIS CONFIGURATION IS THE AVERAGE OF SOME OTHER
C                    CONFIGURATIONS IN THE TABLE
C     MJD (2000)     NUMBER OF ELECTRONS IN LEVEL FROM WHICH ONE IS REMOVED IN
C                    THIS TRANSITION
C     NFO (1500)     SAME AS NF IN DIAPHANOUS
C     NJD (2000)     PRINCIPAL QUANTUM NUMBER (OR REDUCED QUANTUM NUMBER) OF
C                    ELECTRON REMOVED IN THIS TRANSITION.
C     NQ (6, 15, 40) NUMBER OF ELECTRONS IN AN ELECTRON LEVEL IN A CONFIGURATION
C     NRMAX (15)     NUMBER OF CONFIGURATIONS AT AN IONIZATION LEVEL
C     NRSAVE (1500)  CONFIGURATION IDENTIFICATION OF A STATE
C     NSAVE (1500)   QUANTUM NUMBER OF OUTER ELECTRON, IF BEYOND TABLE, OF A
C                    STATE
C     QO (1500)      SAME AS Q IN DIAPHANOUS
C     QWT (15, 40)   DEGENERACY OF A CONFIGURATION
C     W0 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                    CONFIGURATION
C     W1 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                    CONFIGURATION
C     W2 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                    CONFIGURATION
C     *** DIAPH2 ***
C     BE (100)      SAME AS BEJ, INDEXED BY (NF + 1) FOR INITIAL STATE
C     BEJ (1600)    PARAMETER DETERMINING LINE WIDTH FOR A TRANSITION
C     C (10)        CONCENTRATION OF AN ELEMENT (ATOMS/ATOM)
C     COM (12)      COMMENT CARD IN FORMAT 12A6
C     DELE (100)    SUM OF DELI AT PREVIOUS IONIZATION LEVELS (EV)
C     DELEPJ (2200)  ENERGY CHANGE DURING A TRANSITION (EV)
C     DELEPS (1500)  IONIZATION POTENTIAL OF A STATE (EV)
C     DELI (100)     PRESSURE IONIZATION AT AN IONIZATION LEVEL (EV)
C     EPS (1500)     ENERGY OF A STATE, USUALLY REFERRED TO THE ENERGY OF THE
C                    GROUND STATE OF THE NEUTRAL ATOM (EV)
C     EPSPRM (1500)  ENERGY OF A STATE AFTER REDUCTION DUE TO PRESSURE IONIZA-
C                    TION (EV)
C     EX (100)       SAME AS EXJ, INDEXED BY (NF + 1) FOR INITIAL STATE
```

```
C      EXJ (1600)      PARAMETER DETERMINING LINE LOCATIONS FOR A TRANSITION
C      GAMBLK (10)     ARRAY OF GAMMA
C      IJ (2200)       IDENTIFICATION NUMBER OF INITIAL STATE ASSOCIATED WITH A
C                      TRANSITION
C      MAKEZ (1500)    IDENTIFICATION OF STATE TO BE ELIMINATED
C      MJ (2200)       NUMBER OF ELECTRONS IN LEVEL FROM WHICH ONE IS REMOVED IN
C                      THIS TRANSITION
C      NEW (2200)      ORIGINAL IDENTIFICATION NUMBER OF A TRANSITION
C      NF (1500)       NUMBER OF FREE ELECTRONS FOR A STATE
C      NJ (2200)       TOTAL QUANTUM NUMBER (OR REDUCED QUANTUM NUMBER) OF ELEC-
C                      TRON REMOVED DURING A TRANSITION
C      NLAST (10)      INDEX NUMBER OF LAST STATE IN TABLE FOR AN ELEMENT
C      PHI (2200)      STRENGTH OF EDGE DUE TO THIS TRANSITION
C      Q (1500)        DEGENERACY OF A STATE
C      R (1500)        FIRST PROPORTIONAL TO LOG POPULATION AND THEN TO POPULATION
C                       OF A STATE
C      RS (10)         FIRST MAXIMUM R, THEN SUM OF R'S, FOR AN ELEMENT
C      SMALLP (1500)   POPULATION OF A STATE
C      TESTJ (2200)    LOWEST VALUE OF MU AT WHICH THE ABSORPTION COEFFICIENT IS
C                      AFFECTED BY THE LINE SERIES FOR THIS TRANSITION
C      TKBLK (10)      ARRAY OF KT
C      U (5)           COEFFICIENTS IN GAUSSIAN INTEGRATION
C      R (5)           COEFFICIENTS IN GAUSSIAN INTEGRATION
C      UOLD (2200)     LOCATION OF EDGE DUE TO THIS TRANSITION (EV/EV)
C      UPRM (2200)     LOWERED EDGE TO APPROXIMATE HIGH LINES (EV/EV)
C      W (10)          ATOMIC WEIGHT OF AN ELEMENT
C      Z (10)          ATOMIC NUMBER OF AN ELEMENT
C      *** DIAPER ***
C      AMU (1000)      ABSORPTION COEFFICIENT AT A PARTICULAR VALUE OF MU(.6 .LE.
C                      MU .LE. 15) (PER CM)
C      BMU (1000)      BOTTOM OF EDGE OCCURING AT A PARTICULAR VALUE OF MU(MU .GT.
C                       15)(PER CM)
C      ID (12)         COMMENT CARD
C      TMU (1000)      TOP OF EDGE OCCURING AT A PARTICULAR VALUE OF U (U>15) (PER
C                       CM)
C      *** SPECTRA ***
C      DEFECT (100, 4)QUANTUM DEFECT INDEXED BY THE IONIZATION LEVEL AND L + 1
C      DELEPJ (3500)   SAME AS DELEPJ IN DIAPHANOUS
C      EPSD (1750)     SAME AS EPS IN DIAPHANOUS
C      DELEPS (1750)   SAME AS DELEPS IN DIAPHANOUS
C      IJD (3500)      SAME AS IJ IN DIAPHANOUS
C      IONZC (100)     ZCORE FOR AN IONIZATION LEVEL
C      L (19)          L FOR AN ELECTRON LEVEL
C      LIN (10)        LEVEL AT WHICH AN ELECTRON IS BEING ADDED
C      LOUT (10)       LEVEL AT WHICH AN ELECTRON IS BEING REMOVED
C      MJD (3500)      SAME AS MJ IN DIAPHANOUS
C      N (19)          N FOR AN ELECTRON LEVEL
C      NE (92, 19)     NUMBER OF ELECTRONS PER ELECTRON LEVEL IN THE GROUND STATE
C                      OF AN IONIZATION LEVEL
C      NFD (1750)      SAME AS NF IN DIAPHANOUS
C      NJD (3500)      SAME AS NJ IN DIAPHANOUS
C      GD (1750)       SAME AS G IN DIAPHANOUS
C
       REAL LONG
       REAL LENGTH
```

```
      INTEGER NEWID, BLANK
      INTEGER DASA
      INTEGER GA
      DIMENSION NEWID(12)
      DIMENSION ID(12), A(20), B(2), U1(150), GARY(150), AMU(150),
     1          DAVE (150),DUMMY(30)
      DIMENSION THETA(5000), XGAMMA(5000), RHO(5000)
      DIMENSION U2(1500), BMU(1500), TMU(1500), COMP(10), IZ(10)
      DATA DENSER/ 6HDENSER /
      DATA INDEXA / 1/
      DATA LRN / 1 / , DUMMY / 30*0. /
      DATA IFILE1 / 0 / , BLANK / 6H       /
C
      MOUT = 10
    1 CONTINUE
C
C     MEND      IF (MEND .EQ. 0) ANOTHER SADY TAPE IS READ
C               IF (MEND .NE. 0) THE RUN TERMINATES
C     IFILE     IF (IFILE .NE. 0) NO END OF FILE MARKER IS PUT ON AFTER
C                  THIS DIAPHANOUS TAPE HAS BEEN READ
C               IF (IFILE .EQ. 0) AN END OF FILE MARKER IS PUT ON AFTER
C                  THIS TAPE HAS BEEN READ
C     IWRIT     IF (IWRIT .NE. 0) THE DIAPHANOUS INPUT TAPE IS EDITED
C               IF (IWRIT .EQ. 0)THE DIAPHANOUS INPUT TAPE IS NOT EDITED
C
C
C     MIN       IS THE INPUT TAPE UNIT.  MIN MUST BE READ FOR EVERY
C                  INPUT TAPE TO BE READ
C
C     ALL DENSER TAPES MUST BE WRITTEN IN 556 BPI -
C     THIS IS ACCOMPLISHED BY SPECIFYING THE H OPTION ON THE TAPE
C     ASSIGNMENT CARD
C
C
      READ (5,8001) MIN, MEND, IFILE, IWRIT, TK, GAM
 8001 FORMAT (4I2, 2E15.8)
      IF (MIN .EQ. 0) MIN=15
      READ (5,8000) NZ, (IZ(K), COMP(K), K=1,NZ)
 8000 FORMAT (I2, 8X 6(I2, 2X, F6.4), / 4(I2, 2X, F6.4) )
      IF ((NZ .LT. 1) .OR. (NZ .GT. 10)) CALL MERR
      WRITE (6,8003) MIN, MEND, IFILE, IWRIT
 8003 FORMAT (1H0,7H MIN = ,I4,8H MEND = ,I4,9H IFILE = ,I4,9H IWRIT = ,
     1I4)
      WRITE (6,8004) NZ,(I,COMP(I),IZ(I),I=1,NZ)
 8004 FORMAT (1H0, 5HNZ = , I2, /(1H ,I2,2X,F6.4,2X,I2/))
      READ (5,8005) (NEWID(I),I=1,12)
 8005 FORMAT (12A6)
      IF (NEWID(1) .NE. BLANK) WRITE (6,8006) (NEWID(I),I=1,12)
 8006 FORMAT (1H0, 12A6)
      REWIND MIN
      IRCD = 0
      NRCD = 0
      IDMU2 = 1500
C
      IF (IWRIT .NE. 0)
```

```
     1WRITE (6,9990)
      READ(MIN) A(1)
      WRITE (6,9995) A(1)
      IF (A(1))25,999,999
   25 IF(A(1)+1.) 999,2500,999
 2500 CONTINUE
      NRCD = NRCD + 1
      READ (MIN) (ID(I),I=1,12)
      WRITE (6,9999) (ID(K),K=1,12)
      IF (NEWID(1) .EQ. BLANK) GO TO 27
      DO 28 I=1,12
      ID(I) = NEWID(I)
   28 CONTINUE
   27 CONTINUE
      IF (IFILE1 .NE. 0) GO TO 26
      WRITE (MOUT,3) DENSER, (ID(K),K=1,12), NZ, (COMP(K),IZ(K),K=1,NZ)
    3 FORMAT (13A6/I2,(F6.4,I2))
      IRCD = IRCD + 2
   26 CONTINUE
      NRCD = NRCD + 1
      READ(MIN) A(1)
      IF (IWRIT .NE. 0)
     1WRITE (6,9995) A(1)
      IF(A(1)+2.) 999,3002,999
 3002 CONTINUE
      NRCD = NRCD + 1
   32 READ (MIN) (B(I),I=1,2)
      IF (TK .GT. B(1)) GO TO 7000
      IF (GAM .GT. B(2)) GO TO 7000
      WRITE (6,9998) (B(J),J=1,2)
      IF (IWRIT.EQ.0) WRITE (6,9995) A(1)
      THETA (INDEXA)=B(1)
      XGAMMA(INDEXA)=B(2)
 7000 CONTINUE
      J = 2
      M = 6
      ULAST1 = 0.
      ALAST1 = 0.
      U2(J) = 0.
      GARY(1) = 0.
      DAVE(1) = 0.
      THETA = B(1)
      GAMMA = B(2)
      IF ((TK .LE. B(1)) .AND. (GAM .LE. B(2)))
     2NRCD = NRCD + 1
   34 READ(MIN) A(1), A(2)
      IF ((A(1) .LT. 0.) .AND. ((TK .LE. B(1)) .AND. (GAM .LE. B(2))))
     1WRITE (6,9995) A(1)
      UX = A(1)
      UY = A(2)
      IF ((TK .LE. B(1)) .AND. (GAM .LE. B(2)))
     2NRCD = NRCD + 1
      IF(UX + 3.) 35,65,35
   35 IF(UX + 4.) 40,75,40
   40 IF(UX + 6.) 55,45,55
```

```
   45 READ(MIN) A(1), A(2)
      IF (IWRIT .NE. 0)
     1WRITE (6,9000) A(1),A(2)
      U1(M) = A(1)
      AMU(M) = A(2)
      M = M+1
      UX = A(1)
      UY = A(2)
      IF ((TK .LE. B(1)) .AND. (GAM .LE. B(2)))
     2NRCD = NRCD + 1
      IF(UX .LE. 0.) GO TO 4500
      ULAST = UX
      ULAST1 = UX
      ALAST1 = UY
      AKLAST = UY
      GO TO 54
 4500 WRITE(6,9000) UX, UY
      REWIND MIN
      CALL EXIT
   55 U1(M) = UX
      AMU(M) = UY
      M = M+1
      GO TO 54
   65 READ(MIN) A(1), A(2), A(3)
      UX = A(1)
      UY = A(2)
      UZ = A(3)
      IF ((TK .LE. B(1)) .AND. (GAM .LE. B(2)))
     2NRCD = NRCD + 1
      IF(UX + 4.) 70,74,70
   70 U2(J) = UX
      BMU(J) = UY
      TMU(J) = UZ
      J = J+1
      IF(J-IDMU2) 65,65,72
   72 WRITE(6,15) IDMU2, THETA, GAMMA, U2(J-1)
   73 READ(MIN) A(1), A(2), A(3)
      UX = A(1)
      UY = A(2)
      UZ = A(3)
      IF ((TK .LE. B(1)) .AND. (GAM .LE. B(2)))
     2NRCD = NRCD + 1
      IF(UX + 4.) 73,74,73
   74 ULAST=U2(J-1)
      AKLAST=TMU(J-1)
   75 CONTINUE
      M = M - 1
      IF (TK .GT. B(1)) GO TO 7001
      IF (GAM .GT. B(2)) GO TO 7001
      IF (IWRIT .NE. 0)
     1WRITE (6,9980) (U1(K),K=6,M)
      IF(GARY(1) .NE. 0.) WRITE(6,9002) GARY
      IF (IWRIT .NE. 0)
     1WRITE (6,9982) (AMU(K),K=6,M)
      IF(DAVE(1) .NE. 0.) WRITE(6,9002) DAVE
```

```
      IF (DAVE(1) .NE. 0.) CALL MERR
      READ(MIN) (A(JM), JM=1,8)
      WRITE (6,9997) (A(JM),JM=1,8)
      WRITE (6,4)
    4 FORMAT (1H )
      IF(U2(2) .EQ. 0.) GO TO 76
      J = J - 1
      IF (IWRIT .EQ. 0) GO TO 76
      WRITE (6,9984) (U2(K),K=2,J)
      WRITE (6,9986) (BMU(K),K=2,J)
      WRITE (6,9988) (TMU(K),K=2,J)
   76 CONTINUE
      RHO(INDEXA)=A(2)
      INDEXA=INDEXA+1
      WRITE (MOUT,2) J, M, ULAST1, ALAST1, B(1), B(2), (A(JM),JM=1,20),
     1              (U1(K),K=6,M), (AMU(K),K=6,M), (U2(K),K=2,J),
     2              (BMU(K),K=2,J), (TMU(K),K=2,J)
      NRCD = NRCD + 1
      IRCD1 = 11 + 2 * (M - 5) + 3 * (J - 1)
      IRCD2= IRCD1 / 14
      IRCD14 = IRCD2* 14
      IF (IRCD1 .GT. IRCD14) IRCD2= IRCD2 + 1
      IRCD = IRCD + 1 + IRCD2
 7001 CONTINUE
      READ (MIN) A(1)
      IF (IWRIT.NE.0) WRITE (6,9996) A(1)
      UX = A(1)
      IF (((K .LE. B(1)) .AND. (GAM .LE. B(2)))
     2NRCD = NRCD + 1
      IF(UX + 2.) 77,32,999
   77 IF(UX + 5.) 999,155,999
  155 CONTINUE
      IF (IWRIT.EQ.0) WRITE (6,9995) A(1)
C
      NRCD = NRCD + 1
C     THE ABOVE RECORD COUNT INCLUDES THE EOF RECORD
      IFILE1 = IFILE
      LONG = FLOAT(NRCD) * .0625
      LENGTH = FLOAT(IRCD) * .0658
      WRITE (6,8007) LONG, NRCD, LENGTH, IRCD
      CALL REWI(MIN)
      IF (IFILE .NE. 0) GO TO 1
      I = -5
      WRITE (MOUT,2) I, LRN, DUMMY
      IRCD = IRCD + 2
 8007 FORMAT (58H0THE DIAPHANOUS TAPE HAS BEEN CONDENSED SUCCESSFULLY FR
     1OM , F10.2,10H FEET WITH, I6, 21H PHYSICAL RECORDS TO ,F9.2,/10H0F
     2EET WITH,I5,18H PHYSICAL RECORDS.)
      ENDFILE MOUT
      IF (MERU .EQ. 0) GO TO 1
      REWIND MOUT
      INDEXA=INDEXA-1
      WRITE(6,9001) (THETA(K),XGAMMA(K),RHO(K),K=1,INDEXA)
 9001 FORMAT(1H1,8X,
     1          6HTHETA ,9X, 6HGAMMA ,11X,4HRHO ,/(3(3X,1PE12.5)))
```

```
      CALL EXIT
  999 CONTINUE
      WRITE (6,9901)
 9901 FORMAT (53H THERE IS AN ERROR IN THIS RUN. MERR HAS BEEN CALLED.)
      CALL MERR
C
C     ***************** F O R M A T S **********************
   15 FORMAT  (42H 2ND SET OF DIAPHANOUS DATA HAS MORE THAN I3, 19H ENTR
     2IES.  THETA = F7.2, 8H, GAMMA=1PE10.5,20H, NO GOOD ABOVE U = 0PF6.
     31)
 9000 FORMAT(9H0 ULAST = 1PE15.7, 3X 8HAKLAST = E15.7)
 9002 FORMAT(1P10E12.5)
 9980 FORMAT(10H0 U1 ARRAY // (1P10E12.5))
 9982 FORMAT(11H0 AMU ARRAY // (1P10E12.5))
 9984 FORMAT(10H0 U2 ARRAY //(1P10E12.5))
 9986 FORMAT(11H0 BMU ARRAY // (1P10E12.5))
 9988 FORMAT(11H0 TMU ARRAY // (1P10E12.5))
 9990 FORMAT(1H1)
    2 FORMAT (2I4, 13E9.4, / (14E9.4))
 9995 FORMAT(10H  SIGNAL = F6.1)
 9996 FORMAT(10H1 SIGNAL = F6.1)
 9997 FORMAT(6H ZBAR=F8.4, 1X 4HRHO=1PE11.5, 2X 2HP=E11.5, 2X 2HE=E11.5,
     1 2X 5HKROS=E11.5, 2X 6HKPLNK=E11.5, 2X 5HEION=E11.5, 2X 5HEGAM=
     20PF9.3)
 9998 FORMAT(9H0 THETA = 1PE15.7, 3X 7HGAMMA = E15.7)
 9999 FORMAT(1H0, 12A6)
      END
```

format. The data from each separate set of DIAPHANOUS input tapes are written onto one file on the output tape. The condensed tape may contain several files, each of which corresponds to some chosen set of DIAPHANOUS tapes.

DENSER reads the DIAPHANOUS tape, under control of the variables TK and GAM (see below), the tape consisting of very short binary records, and stores the data into arrays. These arrays are written onto the output tape in 14 word records. Either the identification record from the DIAPHANOUS tape, or a new identification record, plus a material composition record is written as the first two records of every file on the DENSER output tape. All of the data at a given temperature-gamma point on a DIAPHANOUS tape are preserved in the condensation. The DENSER identification record need not be the same as the identification record that was on the DIAPHANOUS tape.

The output records made by DENSER must incorporate the information that DIAPHANOUS tapes formerly conveyed by signals. The possible situations at a given temperature-gamma point are:

1. The DIAPHANOUS tape had both extrapolated data (before $u = \frac{h\nu}{KT} = 15$) and edge data (i.e., both (-6.) and (-3.) signals were present).
2. The DIAPHANOUS tape had extrapolated data but no edge data (i.e., (-6.), but not a (-3.), signal was present).
3. The DIAPHANOUS tape had edge data but no extrapolated data (a (-3.), but not a (-6.), signal was present).
4. Neither extrapolated nor edge data were present (neither a (-6.) nor a (-3.) signal was present).

In the DENSER program, ULAST1, ALAST1, and U2(2) are all set to zero at the beginning of the processing done for each temperature-gamma point. If they are still zero when the DENSER output record is written, we have case (4). If a (-6.) signal is encountered on the DIAPHANOUS tape, then ULAST1 and ALAST1 are modified to specify the values of $h\nu/KT$ and

the absorption coefficient at the place where extrapolation began. If no (-3.) signal is encountered, U2(2) is still set to zero, and case (2) has been specified. If edge data are present U2(2) is modified to specify the location of the first edge. If a (-6.) had previously been encountered, then U2(2), ULAST1, and ALAST1 are nonzero and we have case (1). If no extrapolation has been performed, and edge data were present, we have case (3) with U2(2) ≠ 0., but ULAST1=ALAST1-0.

The DENSER program contains two write statements. They, and their respective formats, are:

```
    WRITE (10,3) DENSER, (ID(K), K=1,12), NZ, (COMP(K), IZ(K), K=1,NZ)
  3 FORMAT (13A6/I2, (F6.4,I2))
```

The above write statement is used once to write identification data at the beginning of each file on the DENSER tape. The named variables are discussed below or are clear from context.

```
    WRITE (10,2)J,M,ULAST1, ALAST1,B(1),B(2),(A(JM),JM=1,20),
    (U1(K),K=6,M),(AMU(K),K=6,M),(U2(K),K=2,J),(BMU(K)K=2,J),
    (TMU(K),K=2,J)
  2 FORMAT (2I4,13E9.4,/(14E9.4))
```

The above write statement is used to write the data at each temperature and density point.

The length of the input DIAPHANOUS tapes and the length of each file on the DENSER output tape are computed after each file is completed. These values will help the user determine how many files can be written on a DENSER tape.

One may edit the input DIAPHANOUS tape, if desired, in the same manner as in present use. (DENSER is an adaptation of the DAPHNE code, which is able to edit DIAPHANOUS tapes.) A program was also coded to edit the files on the new condensed DIAPHANOUS tape, and this new program, DASE, can be used as a subroutine of DENSER to edit each file as it is written. DASE is in FORTRAN IV language. (Refer to separate writeup.)

Input for DENSER

CARD NO.	INPUT VARIABLE	COLUMNS	FORMAT
1	MIN	1-2	I2
	MEND	3-4	I2
	IFILE	5-6	I2
	IWRIT	7-8	I2
	TK	9-23	E15.8
	GAM	24-38	E15.8
2	NZ	1-2	I2
	IZ(1)	11-12	I2
	COMP(1)	15-20	F6.4
	IZ(2)	21-22	I2
	COMP(2) up to 10	25-30 etc.	F6.4
3	NEWID	1-72	12A6

These three data cards must be repeated for each DIAPHANOUS input tape. Card 3 needs to contain the above data only when the input tape is the first tape used to create a given file. (For subsequent tapes used to continue this file, it can be a blank card.)

MIN	The unit on which the input tape is mounted. If MIN = 0, MIN is set to 15 in the program
MEND	If MEND ≠ 0, the program terminates after this set of input cards is processed; otherwise the program goes back to read the next set of input cards
IFILE	If IFILE ≠ 0, no end-of-file is written at the end of the data read from this input tape; otherwise, an end-of-file is written
IWRIT	If IWRIT ≠ 0, the DIAPHANOUS tape is edited in the fashion of DAPHNE; otherwise, only a limited printout is allowed
NZ	The number of elements in the material whose data are on the input DIAPHANOUS tape; $1 \leq NZ \leq 10$

IZ	The array of atomic numbers of the elements in the material on the input DIAPHANOUS tape. NZ atomic numbers are written on the DENSER tape
COMP	The array of number fractions corresponding to the elements in the IZ array. NZ number fractions are written on the DENSER tape
NEWID	An array of 12 alphanumeric words that allow a new title to be written on the DENSER tape. If this card is blank, the ID array from the SADY tape will be used as a title on the DENSER tape

To use the DENSER program, the following tapes must be mounted:

1. The input tapes are DIAPHANOUS tapes and may be mounted on any unit except unit 10
2. The output tape must be mounted on unit 10

TK, GAM	If both TK and GAM are nonzero, the DIAPHANOUS input tape is spaced to the data at this temperature-gamma point. Writing on the DENSER tape then starts with the data at this point. GAM is the electronic degeneracy factor and is $\Gamma \simeq [(0.01)(A)\,\theta^{3/2}]/(\rho\bar{Z})$, where A is the mean atomic weight, θ is the temperature in eV, ρ is the density in gm/cc, and $\bar{Z}$ is the mean ionization (Ref. 2). If TK is zero, the DIAPHANOUS tape is not spaced. If GAM is zero, the DIAPHANOUS tape is spaced to the first Γ point at which the temperature is TK.

DASE: AN EDITING CODE FOR DENSER-PRODUCED TAPES

DASE has been coded in FORTRAN IV language to edit a tape file from a multifile card-image DENSER tape. Each tape file of a DENSER tape is a condensation of a set of DIAPHANOUS tapes for a certain material. (Refer to the DENSER code writeup.)

DASE edits either the complete file or that part of the file from the beginning of a specified temperature set to the end of the file. DASE also has the ability to space a preliminary DENSER tape file to a specified temperature-gamma data set.

```
      PROGRAM DASE(INPUT,OUTPUT,TAPE10,TAPE5=INPUT,TAPE6=OUTPUT)
C
C     THIS PROGRAM WAS WRITTEN BY L. R. NORRIS
C     THIS ROUTINE WILL EDIT A COMPRESSED DIAPHANOUS TAPE
C  IN THIS PROGRAM TKIN AND GAMIN SPECIFY THE TEMPERATURE AND GAMMA
C  AFTER WHICH THE TAPE IS SPACED TO
C  TWRITE SPECIFIES THE TEMPERATURE AT WHICH THE PROGRAM STARTS WRITING
C  VALUES FROM THE DENSER TAPE ONTO THE OUTPUT FILE
C  WHEN THETA=TKIN AND GAMMA=GAMIN ARE FOUND, LRN IS RESET FROM ZERO
C  TO ONE
C  ISPACO IS NOT USED BY THIS CODE
C     ISPACO IS IN THIS CODE TO MAINTAIN COMPATIBILITY WITH DAPHNE INPUT
C
      DIMENSION D2(1500), BMU(1500), TMU(1500)
      DIMENSION ID(12),I2(10), A(20), D1(150), AMU(150), COMP(10)
      INTEGER DENSER
      DATA DENSER / 6HDENSER /,EPS /1.E-6/, ISPACO/0/
C
C     FORMATS
 1001 FORMAT (1H0, A6,3X,12A6)
 1002 FORMAT (1H0, 5HNZ = , I2, /(1H ,I2,2X,F6.4,2X,I2/))
 1003 FORMAT (9H1THETA = ,1PE9.4, 3X,8HGAMMA = ,1PE9.4)
 1004 FORMAT (30H0TRANSITIONS WERE EXHAUSTED AT / 1H , 5H D = , 1PE9.4,
     1        10H AND MU = , 1PE9.4)
 1005 FORMAT (10H0D VALUES // (1H ,10(1X,1PE9.4,2X)))
 1006 FORMAT (10H0MU VALUES // (1H ,10(1X,1PE9.4,2X)))
 1007 FORMAT (10H0D VALUES // (1H ,10(1X,1PE9.4,2X)))
 1008 FORMAT (35H0MU VALUES AT THE TOP OF THE EDGE // (1H ,10(1X,1PE9.4,
     12X)))
 1009 FORMAT (38H0MU VALUES AT THE BOTTOM OF THE EDGE //(1H ,10(1X,1PE9.
     14,2X)))
 1010 FORMAT (18H0EDGE DATA FOLLOWS)
 1012 FORMAT (8H0ZBAR = ,F8.4,7H RHO = ,1PE9.4,5H P = ,1PE9.4,
     1        5H E = ,1PE9.4,8H RROS = ,1PE9.4,9H RPLNK = ,1PE9.4,
     2        10H EIPART = ,1PE9.4,8H EGAM = ,0PF6.3,/(1P8E15.8) )
 1020 FORMAT (2I4, 13E9.4, / (14E9.4))
 1019 FORMAT (13A6/I2,(F6.4,I2))
C
      NEW = 10
C     THIS PROGRAM DOES NOT REWIND THE DENSER TAPE BEFORE READING
C     SO THAT THE NTH FILE ON A DENSER TAPE MAY BE EDITED  BY DASE   -
C     SUCH REWINDING MUST BE DONE BEFORE EXECUTING DASE
      WRITE (6,7001)
 7001 FORMAT (1H1,36H BCD-COMPRESSED DIAPHANOUS EDIT RUN //)
      READ(5,9007) TKIN, GAMIN, TWRITE, ISPACO
 9007 FORMAT (3F10.8,I2)
      WRITE(6,9970) TKIN, GAMIN,TWRITE,ISPACO
 9970 FORMAT (25H THE INPUT TEMPERATURE = ,1PE15.8,/,
     1         19H THE INPUT GAMMA = ,1PE15.8,/
     2         ,11H  TWRITE = ,1PE15.8,10H ISPACO = ,I3)
      DATA LRN / 0 /, NRCD / 0 /, IFLAG/ 0 /
C
   10 CONTINUE
```

```
      READ (NEW,1019) IUX, (ID(I),I=1,12), NZ, (COMP(K),IZ(K),K=1,NZ)
      IF (IUX .NE. DENSER) CALL MERR
      WRITE (6,1001) IUX, (ID(I),I=1,12)
      WRITE (6,1002) NZ,(I,COMP(I),IZ(I),I=1,NZ)
C
   20 CONTINUE
      READ (NEW,1020) J, M, ULAST, AKLAST, THETA, GAMMA, (A(K),K=1,20),
     1          (U1(I),I=6,M), (AMU(I),I=6,M), (U2(I),I=2,J),
     2          (BMU(I),I=2,J), (TMU(I),I=2,J)
      IF (J .EQ. (-5)) GO TO 100
      NRCD = NRCD + 1
      IF (ABS((TRIN-THETA)/THETA).LT.EPS) GO TO 3000
      GO TO 3001
 3000 CONTINUE
      IF(ABS((GAMIN-GAMMA)/GAMMA).LT.EPS) LRN=1
 3001 CONTINUE
      IF (TWRITE.LE.0.) IFLAG=1
      IF (ABS((TWRITE-THETA)/THETA).LT.EPS) IFLAG=1
      IF(IFLAG.NE.1) GO TO 3002
      WRITE (6,1003) THETA, GAMMA
      IF (ULAST .NE. 0.) WRITE (6,1004) ULAST, AKLAST
C
C     WRITE TRANSITION DATA
      WRITE (6,1005) (U1(I),I=6,M)
      IF ((M .GT. 150) .OR. (J .GT. 500)) CALL MERR
      WRITE (6,1006) (AMU(I),I=6,M)
C
C     WRITE EDGE DATA, IF ANY EXIST
      IF (U2(2) .EQ. 0.) GO TO 30
      WRITE (6,1010)
      WRITE (6,1007) (U2(I),I=2,J)
      WRITE (6,1009) (BMU(I),I=2,J)
      WRITE (6,1008) (TMU(I),I=2,J)
   30 CONTINUE
      WRITE (6,1012) (A(K),K=1,20)
 3002 CONTINUE
      IF(LRN.NE.1) GO TO 20
      WRITE(6,9991) THETA, GAMMA
 9991 FORMAT(61H0THE DENSER DIAPHANOUS TAPE HAS BEEN SPACED TO AFTER THE
     1TA = , F10.4, 5X, 8H GAMMA = , F10.4)
C
  100 CONTINUE
      WRITE (6,1011) NRCD
 1011 FORMAT (39H1THIS TAPE HAS BEEN EDITED SUCCESSFULLY./
     1    11H THERE ARE ,I5, 24H THETA, GAMMA DATA SETS.)
      RETURN
      END
```

This feature of the program is useful when a DENSER tape file is not completed in a given DENSER run or when more data are to be added to the file at a later time.

Input for DASE

CARD NO.	INPUT VARIABLE	COLUMNS	FORMAT
1	TKIN	1-10	F10.8
	GAMIN	11-20	F10.8
	TWRITE	21-30	F10.8
	ISPACO	31-32	I2

TKIN — The temperature to which the tape is spaced. If TKIN is blank, the tape is not spaced. TKIN is in eV

GAMIN — The Γ to which the tape is spaced; if GAMIN is blank, the tape is not spaced. GAMIN is the "dimensionless electron degeneracy factor" (Ref. 2). Both GAMIN and TKIN must be specified to space the tape

TWRITE — The temperature on the tape at which editing is begun. If TWRITE ≤ 0, then the entire tape is edited

ISPACO — Not used. (This variable was used in the DAPHNE program, which can edit the original DIAPHANOUS tape. DAPHNE input cards can also be used by DASE.)

To use the DASE program, the DENSER tape must be mounted on unit 10. DENSER tapes are written in event parity and at 556 BPI (bits per inch).

DAPHNE: A DIAPHANOUS TAPE-EDIT CODE

DAPHNE reads the DIAPHANOUS tape (Ref. 3), which contains very short binary records, and stores the data into arrays. DAPHNE then prints out these arrays in a suitable format. DAPHNE edits either the complete tape or that part of the tape from the beginning of a specific temperature set through the end of the data on the tape. DAPHNE also has the capability of spacing a DIAPHANOUS tape to the end of a specified temperature-gamma (Ref. 2) data set and putting an end-of-file mark on the tape, or of terminating

```
      PROGRAM DAPHNE(INPUT,OUTPUT,TAPE15,TAPE5=INPUT,TAPE6=OUTPUT)
C
C     DIAPHANOUS EDITION
C
C     VARIABLE NAME  MEANING
C
C     *** AUGEAS ***
C     DELEPJ (2000)  ENERGY CHANGE DURING A TRANSITION (EV)
C     DELEPS (1300)  IONIZATION POTENTIAL OF A STATE (EV)
C     EIN (15)       ENERGY OF GROUND STATE OF AN IONIZATION LEVEL
C     EPSD (1300)    SAME AS EPS IN DIAPHANOUS
C     FPC (3, 3, 3)  FRACTIONAL PERCENTAGE COEFFICIENT FOR TRANSITION BETWEEN
C                    SPLIT CONFIGURATIONS
C     IJD (2000)     IDENTIFICATION NUMBER OF INITIAL STATE ASSOCIATED WITH A
C                    TRANSITION
C     ISPLIT (15, 40)IDENTIFICATION OF A SPLIT CONFIGURATION
C     MERGED (15, 40)TRUE IF THIS CONFIGURATION IS THE AVERAGE OF SOME OTHER
C                    CONFIGURATIONS IN THE TABLE
C     MJD (2000)     NUMBER OF ELECTRONS IN LEVEL FROM WHICH ONE IS REMOVED IN
C                    THIS TRANSITION
C     NFD (1300)     SAME AS NF IN DIAPHANOUS
C     NJD (2000)     PRINCIPAL QUANTUM NUMBER (OR REDUCED QUANTUM NUMBER) OF
C                    ELECTRON REMOVED IN THIS TRANSITION.
C     NQ (6, 15, 40) NUMBER OF ELECTRONS IN AN ELECTRON LEVEL IN A CONFIGURATION
C     NRMAX (15)     NUMBER OF CONFIGURATIONS AT AN IONIZATION LEVEL
C     NRSAVE (1300)  CONFIGURATION IDENTIFICATION OF A STATE
C     NSAVE (1300)   QUANTUM NUMBER OF OUTER ELECTRON, IF BEYOND TABLE, OF A
C                    STATE
C     QD (1300)      SAME AS Q IN DIAPHANOUS
C     QW1 (15, 40)   DEGENERACY OF A CONFIGURATION
C     W0 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                    CONFIGURATION
C     W1 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                    CONFIGURATION
C     W2 (15, 40)    COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                    CONFIGURATION
C     *** DIAPH2 ***
C     BE (100)       SAME AS BEJ, INDEXED BY (NF + 1) FOR INITIAL STATE
C     BEJ (1600)     PARAMETER DETERMINING LINE WIDTH FOR A TRANSITION
C     C (10)         CONCENTRATION OF AN ELEMENT (ATOMS/ATOM)
C     COM (12)       COMMENT CARD IN FORMAT 12A6
C     DELE (100)     SUM OF DELI AT PREVIOUS IONIZATION LEVELS (EV)
C     DELEPJ (2200)  ENERGY CHANGE DURING A TRANSITION (EV)
C     DELEPS (1500)  IONIZATION POTENTIAL OF A STATE (EV)
C     DELI (100)     PRESSURE IONIZATION AT AN IONIZATION LEVEL (EV)
C     EPS (1500)     ENERGY OF A STATE, USUALLY REFERRED TO THE ENERGY OF THE
C                    GROUND STATE OF THE NEUTRAL ATOM (EV)
C     EPSPRM (1500)  ENERGY OF A STATE AFTER REDUCTION DUE TO PRESSURE IONIZA-
C                    TION (EV)
C     EX (100)       SAME AS EXJ, INDEXED BY (NF + 1) FOR INITIAL STATE
C     EXJ (1600)     PARAMETER DETERMINING LINE LOCATIONS FOR A TRANSITION
C     GAMBLK (10)    ARRAY OF GAMMA
C     IJ (2200)      IDENTIFICATION NUMBER OF INITIAL STATE ASSOCIATED WITH A
C                    TRANSITION
```

```
C       MAKEZ (1500)    IDENTIFICATION OF STATE TO BE ELIMINATED
C       MJ (2200)       NUMBER OF ELECTRONS IN LEVEL FROM WHICH ONE IS REMOVED IN
C                       THIS TRANSITION
C       NEW (2200)      ORIGINAL IDENTIFICATION NUMBER OF A TRANSITION
C       NF (1500)       NUMBER OF FREE ELECTRONS FOR A STATE
C       NJ (2200)       TOTAL QUANTUM NUMBER (OR REDUCED QUANTUM NUMBER) OF ELEC-
C                       TRON REMOVED DURING A TRANSITION
C       NLAST (10)      INDEX NUMBER OF LAST STATE IN TABLE FOR AN ELEMENT
C       PHI (2200)      STRENGTH OF EDGE DUE TO THIS TRANSITION
C       Q (1500)        DEGENERACY OF A STATE
C       R (1500)        FIRST PROPORTIONAL TO LOG POPULATION AND THEN TO POPULATION
C                        OF A STATE
C       RS (10)         FIRST MAXIMUM R, THEN SUM OF R'S, FOR AN ELEMENT
C       SMALLP (1500)   POPULATION OF A STATE
C       TESTJ (2200)    LOWEST VALUE OF MU AT WHICH THE ABSORPTION COEFFICIENT IS
C                       AFFECTED BY THE LINE SERIES FOR THIS TRANSITION
C       TKBLK (10)      ARRAY OF KT
C       U (5)           COEFFICIENTS IN GAUSSIAN INTEGRATION
C       R (5)           COEFFICIENTS IN GAUSSIAN INTEGRATION
C       UOLD (2200)     LOCATION OF EDGE DUE TO THIS TRANSITION (EV/EV)
C       UPRM (2200)     LOWERED EDGE TO APPROXIMATE HIGH LINES (EV/EV)
C       W (10)          ATOMIC WEIGHT OF AN ELEMENT
C       Z (10)          ATOMIC NUMBER OF AN ELEMENT
C       *** DIAPER ***
C       AMU (1000)      ABSORPTION COEFFICIENT AT A PARTICULAR VALUE OF MU(.6 .LE.
C                       MU .LE. 15) (PER CM)
C       BMU (1000)      BOTTOM OF EDGE OCCURING AT A PARTICULAR VALUE OF MU(MU .GT.
C                        15)(PER CM)
C       ID (12)         COMMENT CARD
C       TMU (1000)      TOP OF EDGE OCCURING AT A PARTICULAR VALUE OF U (U>15) (PER
C                        CM)
C       *** SPECTRA ***
C       DEFECT (100, 4)QUANTUM DEFECT INDEXED BY THE IONIZATION LEVEL AND L + 1
C       DELEPJ (3500)   SAME AS DELEPJ IN DIAPHANOUS
C       DELEPS (1750)   SAME AS DELEPS IN DIAPHANOUS
C       EPSD (1750)     SAME AS EPS IN DIAPHANOUS
C       IJD (3500)      SAME AS IJ IN DIAPHANOUS
C       IONZC (100)     ZCORE FOR AN IONIZATION LEVEL
C       L (19)          L FOR AN ELECTRON LEVEL
C       LIN (10)        LEVEL AT WHICH AN ELECTRON IS BEING ADDED
C       LOUT (10)       LEVEL AT WHICH AN ELECTRON IS BEING REMOVED
C       MJD (3500)      SAME AS MJ IN DIAPHANOUS
C       N (19)          N FOR AN ELECTRON LEVEL
C       NE (92, 19)     NUMBER OF ELECTRONS PER ELECTRON LEVEL IN THE GROUND STATE
C                       OF AN IONIZATION LEVEL
C       NFD (1750)      SAME AS NF IN DIAPHANOUS
C       NJD (3500)      SAME AS NJ IN DIAPHANOUS
C       QD (1750)       SAME AS Q IN DIAPHANOUS
C
        DIMENSION U2(1000), BMU(1000), TMU(1000)
        DIMENSION ID(12),A(10),B(10),U1(150),GART(150),AMU(150),DAVE(150)
C
        DATA EPS / 1.E-07 /
        DATA IFLAG/0/
C
```

```
C      TKIN        IS THE TEMPERATURE AFTER WHICH AN END OF FILE IS WRITTEN
C                  OR THE PROGRAM STOPS SPACING
C      GAMIN       IS THE GAMMA AFTER WHICH AN END OF FILE IS WRITTEN OR
C                  THE PROGRAM STOPS SPACING
C      TWRITE      IS THE TEMPERATURE AT WHICH THE PROGRAM STARTS WRITING
C                  VALUES FROM THE DAPHNE TAPE ONTO THE OUTPUT TAPE
C
C                  IF (TWRITE .LE. 0.) EDIT ENTIRE TAPE
C
C      IF (ISPACD .LT. 0)          AN END OF FILE WILL BE PUT ON THE
C                                  DIAPHANOUS TAPE
C      IF (ISPACD .GE. 0)          DAPHNE SPACES THE DIAPHANOUS TAPE
C                                  PAST A CERTAIN TEMPERATURE AND GAMMA
C      IF SADY IS TO BE USED AFTER THE TAPE IS SPACED BY DAPHNE, THEN THE
C      USER MUST USE AN ID CARD WITH COLUMNS 1 - 6 BLANK AS INPUT TO SADY
C
C      LRN         IS A SIGNAL WHICH IS SET TO 1 WHEN GAMIN AND TKIN ARE
C                  FOUND ON THE TAPE. IT IS TESTED AT THE END OF EACH THETA,
C                  GAMMA SET.  ITS VALUE IS ZERO, OTHERWISE.
C
      READ (5,9007) TKIN, GAMIN, TWRITE, ISPACD
      WRITE (6,9970) TKIN, GAMIN, TWRITE, ISPACD
 9007 FORMAT (3F10.0,I2)
 9970 FORMAT (25H THE INPUT TEMPERATURE = ,1PE15.8,/,
     1        19H THE INPUT GAMMA = ,1PE15.8,/
     2        ,11H  TWRITE = ,1PE15.8,10H ISPACD = ,I3)
      MIN = 15
      LRN = 0
      REWIND MIN
      NRCD = 0
      IDMO2 = 1000
C
      WRITE(6,9990)
      READ(MIN) A(1)
      WRITE(6,9995) A(1)
      IF (A(1))25,999,999
   25 IF(A(1)+1.) 999,2500,999
 2500 CONTINUE
      NRCD = NRCD + 1
      READ (MIN) (ID(I),I=1,12)
      WRITE(6,9999) (ID(K), K=1,12)
      NRCD = NRCD + 1
      READ(MIN) A(1)
      WRITE(6,9995) A(1)
      IF(A(1)+2.) 999,3002,999
 3002 CONTINUE
      NRCD = NRCD + 1
   32 READ (MIN) (B(I),I=1,2)
      IF (ABS((TKIN - B(1))/B(1)) .LT. EPS) GO TO 11
      GO TO 115
   11 CONTINUE
      IF (ABS((B(2) - GAMIN)/B(2) ) .LT. EPS) LRN = 1
  115 CONTINUE
      IF (TWRITE .LE. 0.) IFLAG=1
      IF (ABS((TWRITE - B(1))/B(1)) .LT. EPS) IFLAG=1
```

```
      IF (IFLAG.EQ.1) GO TO 36
      TK = B(1)
      U2(J) = 0.
      NRCD = NRCD + 1
   33 CONTINUE
      NRCD = NRCD + 1
      READ (MIN) A(1),A(2)
      NRCD = NRCD + 1
      IF (A(1) + 3.)  31,61,31
   31 CONTINUE
      IF (A(1) + 4.)  41,36,41
   41 CONTINUE
      IF (A(1) + 6.)  33,42,33
   42 CONTINUE
      READ (MIN)  A(1),A(2)
      NRCD = NRCD + 1
      GO TO 33
   61 CONTINUE
      READ (MIN) A(1),A(2),A(3)
      IF (A(1) + 4.) 62,36,62
   62 CONTINUE
      J = J + 1
      IF (J - IDMU2)  61,61,69
   69 CONTINUE
      READ (MIN) A(1),A(2),A(3)
      NRCD = NRCD + 1
      IF (A(1) + 4.)  69,36,69
   36 CONTINUE
      NRCD = NRCD + 1
      READ (MIN) (A(JM),JM=1,8)
      IF (LRN .NE. 1) GO TO 12
   13 CONTINUE
C     SPACE TAPE TO TKIN, GAMIN POSITION ON THE DIAPHANOUS TAPE
      IF (ISPACO .LT. 0) GO TO 14
      WRITE (6,9001) (B(I), I=1,2)
 9001 FORMAT (54H0THE DIAPHANOUS TAPE HAS BEEN SPACED TO AFTER THETA = ,
     1        1PE15.8,3X,9H GAMMA = ,1PE15.8)
      WRITE (6,9997) (A(JM),JM=1,8)
      WRITE (6,9994) NRCD, LRN
      CALL EXIT
   14 CONTINUE
C     WRITE AN END OF FILE ON THE TAPE
      TND = -5.
      WRITE (MIN) TND
      END FILE MIN
      WRITE (6,9995) TND
      WRITE (6,9003) (B(I), I=1,2)
 9003 FORMAT (61H0AN END OF FILE WAS PUT ON THE DIAPHANOUS TAPE AFTER TH
     1ETA = ,1PE15.8,3X,9H GAMMA = ,1PE15.8)
      GO TO 155
   12 CONTINUE
C
      NRCD = NRCD + 1
      READ (MIN) A(1)
      IF (A(1) + 2.) 77,32,999
```

```
   30 CONTINUE
C
      WRITE (6,9998) (B(J),J=1,2)
      J = 2
      M = 6
      U2(J) = 0.
      GARY(1) = 0.
      UAVE(1) = 0.
      TK = B(1)
      GAMMA = B(2)
      NRCD = NRCD + 1
   34 READ(MIN) A(1), A(2)
      IF(A(1) .LT. 0.) WRITE(6,9995) A(1)
      UX = A(1)
      UY = A(2)
      NRCD = NRCD + 1
      IF(UX + 3.) 35,65,35
   35 IF(UX + 4.) 40,75,40
   40 IF(UX + 6.) 55,45,55
   45 READ(MIN) A(1), A(2)
      WRITE(6,9000) A(1), A(2)
      U1(M) = A(1)
      AMU(M) = A(2)
      M = M+1
      UX = A(1)
      UY = A(2)
      NRCD = NRCD + 1
      IF(UX .LE. 0.) GO TO 4500
      ULAST = UX
      AKLAST = UY
      GO TO 34
 4500 WRITE(6,9000) UX, UY
      REWIND MIN
      CALL EXIT
   55 U1(M) = UX
      AMU(M) = UY
      M = M+1
      GO TO 34
   65 READ(MIN) A(1), A(2), A(3)
      UX = A(1)
      UY = A(2)
      UZ = A(3)
      NRCD = NRCD + 1
      IF(UX + 4.) 70,74,70
   70 U2(J) = UX
      BMU(J) = UY
      TMU(J) = UZ
      J = J+1
      JJ = J-1
      IF (J .EQ. 801) WRITE (6,9004) JJ
 9004 FORMAT  (42H 2ND SET OF DIAPHANOUS DATA HAS MORE THAN ,I3,19H ENTR
     1IES.  THETA = ,F7.2,8H, GAMMA=1PE10.5,19H, NO GOOD ABOVE U =,0PF6.
     21)
      IF(J-IDMU2) 65,65,72
   72 WRITE(6,15) IDMU2, TK, GAMMA, U2(J-1)
```

```
   73 READ(MIN) A(1), A(2), A(3)
      UX = A(1)
      UY = A(2)
      UZ = A(3)
      NRCD = NRCD + 1
      IF(UX + 4.) 73,74,73
   74 ULAST=U2(J-1)
      AKLAST=TMU(J-1)
   75 CONTINUE
      M = M - 1
      WRITE (6,9980) (U1(I), I=1,M)
      IF(GARY(1) .NE. 0.) WRITE(6,9002) GARY
      WRITE (6,9982) (AMU(I), I=1,M)
      IF(DAVE(1) .NE. 0.) WRITE(6,9002) DAVE
      READ(MIN) (A(JM), JM=1,8)
      WRITE(6,9997) (A(JM), JM=1,8)
      IF(U2(2) .EQ. 0.) GO TO 76
      J = J - 1
      WRITE (6,9984) (U2(I), I=1,J)
      WRITE (6,9986) (BMU(I), I=1,J)
      WRITE (6,9988) (TMU(I), I=1,J)
   76 CONTINUE
      NRCD = NRCD + 1
      IF (LRN .EQ. 1) GO TO 13
      READ (MIN) A(1)
      WRITE(6,9996) A(1)
      UX = A(1)
      NRCD = NRCD + 1
      IF(UX + 2.) 77,32,999
   77 IF(UX + 5.) 999,155,999
  155 CONTINUE
C
      NRCD = NRCD + 1
C     THE ABOVE RECORD COUNT INCLUDES THE EOF RECORD
      WRITE (6,9994) NRCD, LRN
      REWIND MIN
      CALL EXIT
  999 CONTINUE
      WRITE (6,9901)
 9901 FORMAT (53H THERE IS AN ERROR IN THIS RUN. MERR HAS BEEN CALLED.)
      CALL MERR
C
C     ****************  F O R M A T S  ********************
   15 FORMAT  (42H 2ND SET OF DIAPHANOUS DATA HAS MORE THAN 13, 19H ENTR
     1IES.  THETA = F7.2, 8H, GAMMA=1PE10.5,20H, NO GOOD ABOVE U = 0PF6.
     31)
 9000 FORMAT(9H0 ULAST = 1PE15.7, 5X 8HAKLAST = E15.7)
 9002 FORMAT(1P10E12.5)
 9980 FORMAT(10H0 U1 ARRAY // (1P10E12.5))
 9982 FORMAT(11H0 AMU ARRAY // (1P10E12.5))
 9984 FORMAT(10H0 U2 ARRAY //(1P10E12.5))
 9986 FORMAT(11H0 BMU ARRAY // (1P10E12.5))
 9988 FORMAT(11H0 TMU ARRAY // (1P10E12.5))
 9990 FORMAT(1H1)
 9994 FORMAT(45H0 TAPE EDITING ON UNIVAC 1108 IS SUCCESSFUL. / 35H0 TOTA
     1L NUMBER OF WRITE RECORDS IS ,I10 / 11H LRN WAS = ,I10)
 9995 FORMAT(10H0 SIGNAL = F6.1)
 9996 FORMAT(10H1 SIGNAL = F6.1)
 9997 FORMAT(6H0UZBAR=F8.4, 1X 4HRHO=1PE11.5, 2X 2HP=E11.5, 2X 2HE=E11.5,
     1 2X 5HRHOS=E11.5, 2X 6HKPLNK=E11.5, 2X 5HEION=E11.5, 2X 5HEGAM=
     20PF9.3)
 9998 FORMAT(9H0 THETA = 1PE15.7, 5X 7HGAMMA = E15.7)
 9999 FORMAT(1H0, 12A6)
      END
```

the run without rewinding the tape. These features are useful when the end of the DIAPHANOUS tape is reached before a DIAPHANOUS run is finished, a previous run is incomplete, or more data are to be added to the DIAPHANOUS tape.

Input for DAPHNE

CARD NO.	INPUT VARIABLE	COLUMNS	FORMAT
1	TKIN	1-10	F10.8
	GAMIN	11-20	F10.8
	TWRITE	21-30	F10.8
	ISPAC0	31-32	I2

TKIN — The temperature to which the tape is spaced; if TKIN is blank, the tape is not spaced. TKIN is in eV

GAMIN — The Γ to which the tape is spaced; if GAMIN is blank, the tape is not spaced. Γ is the "dimensionless electron degeneracy factor." Both GAMIN and TKIN must be specified to space the tape

TWRITE — The temperature on the tape at which editing is begun. If TWRITE $\leq$ 0, then the entire tape is edited

ISPAC0 — If ISPAC0 $<$ 0, then an end-of-file will be put on the DIAPHANOUS tape; if ISPAC0 $\geq$ 0, the tape is spaced to the end of a specified temperature, gamma set, and the run is terminated without rewinding the tape

ANDIMX: CONVERSION OF OPACITY DATA FROM ANN TO DIAPHANOUS FORM

The FORTRAN IV ANDIMX program complex was written to transform ANN opacity data (computed by W. Huebner and D. Koontz at Los Alamos Scientific Laboratory to DIAPHANOUS form.

ANN data tapes are IBM-7094 binary tapes. These are first converted by the ANHIST 1108 machine language program to a UNIVAC-1108 binary tape. In this step, none of the data present on the original ANN tape are modified; however, all the ANN input tape records are brought to a standard UNIVAC-1108 binary format.

BLANK PAGE

```
C                  D) A BLANK CARD SIGNIFIES END OF DATA.  IF NO THETA-
C                     RHO SETS ARE TO BE DELETED, A BLANK DATA CARD MUST
C                     FOLLOW THE SIX CARDS DESCRIBED ABOVE IN 1) AND 2).
C
C     ***********                  WARNING                    ***********
C     CAYT ASSUMED .GE. 100
C     CAYT ASSUMED TO BE CLOSE TO A MULTIPLE OF 100 EV
C     ***********                                             ***********
C
C
      DIMENSION TITLE(60),B1(14), INPUT(10),SIGNAL(7),B2(11),IB(13)
     1,MU(2971),DTU(2971), MU2(2971), BB1(14), IBB(13), BB2(11)
     2,THETA(1000),DNSITY(1000),CAYTE(1000)
      DIMENSION CAYDEL(100), RHODEL(100,25), NRHO(100), ISAVE(100)
     1          ,CAYGON(50), RHOGON(50,25)
C
      REAL MU, MU2
      INTEGER ANIN, ANOUT, DONE
C
C
      DATA X/-1967./, SIGNAL/-1.,-2.,-3.,-4.,-5.,-6.,-7./,DONE/0/,
     1 NEXT/1/,CAYT/0./,MAXRHO/25/,ANUIMX/6HANDIMX/
C
C     B2(9) AND B2(10) ARE SET TO ZERO IN CASE ANHIST-OUTPUT-TAPES
C     CONTAIN 35-WORD FIRST RECORDS (RATHER THAN 37-WORD FIRST RECORDS)
C     AT EACH TEMPERATURE-DENSITY POINT.
      DATA B2(9), B2(10)/2*0./
C
C     M COUNTS THE NUMBER OF TEMPERATURES FOR WHICH DATA ARE TO BE
C       DELETED.
C     IDELET COUNTS THE NUMBER OF DENSITY SETS TO BE DELETED, PER
C       TEMPERATURE.
C     ISAVE(M) IS SET TO NONE IF NO DATA FOR CAYTNO(M) IS TO BE WRITTEN
C       ON THE ANDIMX-OUTPUT-TAPE ANOUT.
C     KOUNT COUNTS TEMPERATURES FOR WHICH DATA ARE TO BE DELETED, AS
C       THEY ARE LOCATED ON ANIN.
C     J COUNTS RHOPTS, PER TEMPERATURE, FOR WHICH DATA ARE TO BE WRITTEN
C       ON ANDIMX-OUTPUT-TAPE ANOUT
C     KJ COUNTS TEMPERATURE-DENSITY SETS WRITTEN ON ANDIMX-OUTPUT-TAPE
C       ANOUT
C     JDELET IS SET TO NONE IF NO DELETIONS ARE TO BE MADE FOR A
C       TEMPERATURE THAT IS READ FROM ANIN.
C
      DATA M/0/, IDELET/0/, NONE/1/, ISAVE/100 * 0/, KOUNT/0/
      DATA J/0/, KJ/1/
C
      DATA MODIFY/6H THESE/, NOTDO/6H  NO  /, EPSILN/1.E-3/
      DATA ISAVET/0/, JDELET/0/, NRHO/100*0/
C
      EQUIVALENCE (ANIN,INPUT(1)),(ANOUT,INPUT(2)),(IMDONE,B1(1)),
     1(CAYT,B1(3)),(MU(1),DTU(1)),(AWT,B1(2)),(RHO,B1(4)),
     2(CAYTEE, B2(11))
C
      READ (5,1) (TITLE(L1),L1=1,52)
    1 FORMAT (12A6)
C
      READ (5,2) ANIN,ANOUT
    2 FORMAT (I2,1X,I2)
      IF(ANIN.EQ.0) ANIN=14
      IF(ANOUT.EQ.0) ANOUT=12
C
      WRITE (6,3) (TITLE(L3),L3=1,52)
    3 FORMAT(1X,12A6, //)
C
      WRITE (6,8) ANIN,ANOUT
    8 FORMAT (8H ANIN = , I2, 9H ANOUT = , I2)
C                                                REWIND ALL TAPES
      REWIND ANOUT
```

```
      REWIND ANIN
      REWIND 2
C
      WRITE (ANOUT)ANDIMX,X,X
      READ (ANIN) (TITLE(KM),KM=53,60)
C                                               WRITE TAPE TITLE
      WRITE (ANOUT)(TITLE(L2),L2=1,60)
      WRITE (6,12) (TITLE(KM),KM=53,60)
   12 FORMAT (1X,8A6, /////)
C
C
C     READ ALL DATA CARDS NECESSARY TO PREVENT SPECIFIED THETA-RHO DATA
C        FROM BEING WRITTEN ON ANOUT, THE ANDIMX OUTPUT TAPE.
C     TEMPERATURES MAY BE SPECIFIED IN ANY ORDER
C     DENSITIES, PER TEMPERATURE, MAY BE SPECIFIED IN ANY ORDER.
C     IT IS, HOWEVER, MORE EFFICIENT TO INPUT TEMPERATURES IN INCREASING
C        ORDER, AND DENSITIES PER TEMPERATURE IN INCREASING ORDER, AS
C        THAT IS THE ORDER IN WHICH THESE QUANTITIES ARE WRITTEN ON ANIN.
C
  400 CONTINUE
      M=            M + 1
      READ (5,500) CATDEL(M), NRHO(M)
  500 FORMAT (F10.4, 8X, I2)
        IF (CATDEL(M) .EQ. 0.) GO TO 410
        IF (NRHO(M) .NE. 0) GO TO 401
C
C     NRHO(M) .EQ. 0. MEANS DELETE ALL DATA AT THAT TEMPERATURE.
      ISAVE(M)=     NONE
      GO TO 400
C
  401 CONTINUE
      NNRHO=        NRHO(M)
      READ (5,501) (RHODEL(M,M1), M1=1,NNRHO)
  501 FORMAT (7E10.5)
C
      GO TO 400
C
C     ALL DATA CARDS HAVE BEEN READ
C
  410 CONTINUE
C     IF (M.EQ.1), NORMAL RUN, NO DELETIONS
        IF (M .EQ. 1) MODIFY = NOTDO
      WRITE (6,502) MODIFY
  502 FORMAT (31HOALL DATA CARDS HAVE BEEN READ, A6, 75H DELETIONS WILL
     1BE MADE (IF NRHO.EQ.0, DELETE ALL DATA AT THE INPUT CAYTNO)  )
        IF (MODIFY .EQ. NOTDO) GO TO 480
      WRITE (6,503)
  503 FORMAT ( / 31H    CAYTNO     NRHO      RHONO  /)
C
      DO 470 M3=1,M
      NNRHO=        NRHO(M3)
      WRITE (6,504) CATDEL(M3), NRHO(M3), (RHODEL(M3,M4), M4=1,NNRHO)
  504 FORMAT (2X, F10.4, 3X, I2, 4X, 1PE10.5, / (21X,1PE10.5))
  470 CONTINUE
      WRITE (6,505)
```

```
  505 FORMAT (1H1)
  480 CONTINUE
C
C
      READ (ANIN) B1,IB,(B2(LC),LC=1,10)
C
C     CATTE STORES THE TEMPERATURE TO BE WRITTEN ON ANOUT.
C     CATTEE STORES THE TEMPERATURE READ FROM ANIN THAT WILL BE
C       WRITTEN AS B2(11) ON ANOUT.
C
      CATTE(KJ)=CATT
      CATTEE = CATT
C
      CATT=     FLOAT (IFIX(CATT/100. + .5 ) * 100 )
CAVEAT    ASSUMES TEMPERATURE .GE. (100-EPSILON)
      ICATT=        CATT
C
  415 CONTINUE
      DO 9 JR=1,MAXRHO
        IF (MODIFY .EQ. NOTDO) GO TO 455
        IF (ICATT .EQ. ISAVET) GO TO 434
C
C     CHECK TO SEE WHETHER CATT IS ONE FOR WHICH DATA ARE TO BE DELETED.
C
      DO 420 M2=1,M
        IF (ABS((CATT-CATDEL(M2))/CATT) .LT. EPSILN) GO TO 430
  420 CONTINUE
      M2=           M
      JDELET=       NONE
      GO TO 450
C
C
C     A TEMPERATURE FOR WHICH DATA ARE TO BE DELETED HAS BEEN LOCATED.
  430 CONTINUE
      KOUNT=        KOUNT + 1
      JDELET=       0
      IDELET=       0
        IF (ISAVE(M2) .EQ. NONE) GO TO 431
      NNRHO=        NRHO(M2)
C
  434 CONTINUE
        IF (JDELET.EQ.NONE .OR. IDELET.EQ.NRHO(M2)) GO TO 450
  435 CONTINUE
      DO 440 M3=1,NNRHO
        IF (ABS((RHO-RHODEL(M2,M3))/RHO) .LT. EPSILN) GO TO 431
  440 CONTINUE
      GO TO 450
C
  431 CONTINUE
C     DELETE THETA-RHO DATA
      ISAVET=       CATT
      READ (ANIN) NOTUSE
      READ (ANIN) NOTUSE
      IDELET=       IDELET + 1
      READ (ANIN) NOTUSE, NOTUSE, CATGON(KOUNT), RHOGON(KOUNT,IDELET)
```

```
      GO TO 14
C
  450 CONTINUE
CAVEAT    ASSUMES .LE. 25=MAXRHO DENSITIES AT EACH TEMPERATURE
      THETA(KJ)=CAYT
      DNSITY(KJ)=RHO
      WRITE (2)  B1,IB,B2
C     ANDIMX OUTPUT TAPES ALL HAVE 38 WORD FIRST RECORDS
C     RECORD 1 SAYS ANDIMX
C
      J=J+1
C
      READ(ANIN) NOTUSE
      READ (ANIN)  NMAX, (NOTUSE,I=1,NMAX),(DTU(I),I=1,NMAX)
C
      DO 5 I=1,NMAX
      U OF I = .3 + FLOAT(I-1) * .01
      MU(I)=RHO*DTU(I)*6.476E7/(CATTEE*(U OF I**3)*AWT)
C
C     CORRECTION FOR INDUCED EMISSION STILL PRESENT.
    5 CONTINUE
C
      ISAVET=CAYT
      WRITE (2)  NMAX,(MU(I),I=1,NMAX)
      WRITE (6,19)    KJ, THETA(KJ), DNSITY(KJ)
   19 FORMAT (14H DATA AT KJ = ,I4, 12H, FOR CAYT = ,E12.4,8H, RHO = ,
     1   E12.5, 27H HAVE BEEN WRITTEN ON DRUM. )
      KJ=KJ+1
C
   14 CONTINUE
C
C
C
      READ (ANIN) B1,IB,(B2(LC),LC=1,10)
      IF (IMDONE .EQ. 0) GO TO 101
C
      CATTE(KJ)=CAYT
      CATTEE = CAYT
      CAYT =    FLOAT (IFIX (CAYT/100. +.5) * 100 )
      ICAYT=CAYT
        IF (ICAYT.NE.ISAVET .AND. ISAVE(M2) .EQ. NONE) GO TO 460
        IF (ICAYT .NE. ISAVET) GO TO 102
        IF (ISAVE(M2) .EQ. NONE) GO TO 431
        IF (MODIFY.EQ.NOTDO .OR. JDELET.EQ.NONE .OR. IDELET.EQ.NRHO(M2))
     1      GO TO 99
      GO TO 435
C
  101 CONTINUE
      DONE = NEXT
  102 CONTINUE
C     WRITE OUT ALL RECORDS FOR A GIVEN TEMPERATURE ON THE ANDIMX OUTPUT
C       TAPE.
C
        IF (MODIFY .EQ. NOTDO) GO TO 461
        IF (JDELET.NE.NONE .AND. IDELET.NE.NRHO(M2)) GO TO 600
```

```
  461 CONTINUE
      DO 7 I=1,J
      BACKSPACE 2
      READ (2) NMAX2, (MU2(K),K=1,NMAX2)
      BACKSPACE 2
      BACKSPACE 2
      READ (2) BB1,IBB,BB2
      BACKSPACE 2
      WRITE (ANOUT) SIGNAL (7), X, X
      WRITE (ANOUT) BB1, IBB ,BB2
      WRITE (ANOUT)  NMAX2, (MU2(K),K=1,NMAX2)
    7 CONTINUE
C
  460 CONTINUE
        IF (ISAVE(M2) .EQ. NONE) BB1(3)=CAYDEL(M2)
      WRITE (6,20) J, BB1(3)
   20 FORMAT (1H0,I4,81H DATA (RHO) SETS HAVE BEEN WRITTEN ON ANDIMX OUT
     1PUT TAPE ANOUT FOR TEMPERATURE =   ,F10.0,//)
      IF(DONE.EQ.NEXT) GO TO  100
      J=0
      REWIND 2
      GO TO 415
   99 CONTINUE
    9 CONTINUE
C
      WRITE (6,15)  THETA(KJ), (DNSITY(LM), LM=1,25)
   15 FORMAT (58H CHANGE MAXRHO=25. THERE ARE TOO MANY DENSITIES AT THET
     1A= , F10.0 /37H0THE FOLLOWING DENSITIES WERE READ IN/(1P10E13.7))
  499 CONTINUE
      CALL MERR
      RETURN
  100 CONTINUE
        IF (KOUNT .NE. M-1) GO TO 601
      WRITE (ANOUT) SIGNAL(5), X,X
      END FILE ANOUT
      REWIND 2
      REWIND ANIN
      REWIND ANOUT
      WRITE (6,18)
   18 FORMAT (34H1 TAPE WRITING ON ANOUT COMPLETED.  )
      WRITE (6,16)
   16 FORMAT(1H1,1X,50H THE TEMPERATURES AND DENSITIES PUT ON ANOUT WERE
     1 /1H0,14X,16HANIN TEMPERATURE,5X,17HANOUT TEMPERATURE,5X,13HANOUT
     2DENSITY  /)
      DO 498 LL=1,KJ
      WRITE (6,17) LL, CAYTE(LL), THETA(LL), DNSITY(LL)
   17 FORMAT (8X,I4,4X,1PE13.7,9X,1PE13.7,7X,1PE13.7)
  498 CONTINUE
      WRITE(6,13)
   13 FORMAT (36H0 ANDIMX RUN SUCCESSFULLY COMPLETED.
      RETURN
C
C     E R R O R   E X I T S
C     A TEMPERATURE FOR WHICH DATA ARE TO BE DELETED HAS BEEN INPUT.
C       HOWEVER, THE INPUT DENSITY CANNOT BE FOUND ON THE ANIN TAPE.
```

```
  600 CONTINUE
      WRITE (6,650) CATDEL(M2), (RHODEL(M2,M5), M5=1,NNRHO)
  650 FORMAT (64H1 A TEMPERATURE FOR WHICH DATA ARE TO BE DELETED HAS BE
     1EN INPUT. / 61H0 HOWEVER, THE INPUT DENSITY CANNOT BE FOUND ON THE
     2 ANIN TAPE / 11H0 CATDEL = ,E12.6, 14H, RHODEL SET=  ,E12.6,
     3 (/37X,E12.6) )
      GO TO 499
C
  601 CONTINUE
C     ALL TEMPERATURES ON ANIN HAVE BEEN CHECKED AGAINST INPUT TEMPERA-
C       TURES FOR WHICH DATA ARE TO BE DELETED.  HOWEVER, NOT ALL THE
C       INPUT TEMPERATURES WERE FOUND.  CHECK FOR INPUT ERROR.
      WRITE(6,651)
  651 FORMAT(60H1 INPUT ERROR.  ALL VALUES OF CATTNO WERE NOT FOUND ON A
     1NIN. )
      GO TO 499
      END
```

The ANHIST output tape is next processed by the ANDIMX program. Both ANN and ANHIST tapes have three records at a given (temperature, density) point. The first contains some thermodynamic data as well as some data that specify the type of calculation done by the ANN code. The ANHIST tape contains a 38-word first record. (ANN tapes contain 38 or fewer words in the first record. If there are less than 38 words, the ANHIST program fills the record with zeros.) This first record is preserved by the ANDIMX program. The second record on the ANN and ANHIST output tapes contains data on the energy levels and occupation numbers used in the ANN calculation at this (temperature, density) point. These data are not needed by the DIANE or radiation transport-hydrodynamics codes and are not present on the ANDIMX output tapes. The third record on the ANN and ANHIST output tapes contains reduced absorption coefficients. Both the continuous and the total (i.e., the "continuous plus lines") absorption coefficients are present. The ANDIMX program transforms the reduced absorption coefficient to the form expected by the DIANE code by the formula

$$\mu_{\text{ANDIMX output}} = 6.476 \times 10^7 \, (\rho\mu_{\text{ANN output}})/(A\,\theta\,u^3),$$

where ρ is the density in gm/cc, A is the atomic weight in gm/mole, μ is the absorption coefficient, and u is the frequency in units of $h\nu/kT$.

On the ANN and ANHIST output tapes, the data at a given temperature are arranged in order of increasing densities. The DIANE program could process these data. However, the General Atomic radiation transport-hydrodynamics codes expect to find opacity data in decreasing density order at a given temperature. Therefore, the ANDIMX code next re-orders the data, at a given temperature, into a decreasing density order.

The ANDIMX output tape is acceptable input to the DIANE program.

The FORTRAN IV program EDITAN can edit ANHIST output tapes or ANDIMX output tapes.

The ANHIST program was written by J. Clow of General Atomic.

Input for ANDIMX

CARD NO.	FORMAT	DESCRIPTION
1-5	12A6	52 words of TITLE information (these data are combined with the 8 word TITLE already on the ANN tape (the ANHIST output tape))
6	I2, 1X, I2	ANIN } ANOUT } integer variables specifying the input and output tape units. If ANIN=0, it is reset to 14: if ANOUT =0, it is reset to 12
7	F10.4, 8X, I2	CAYDEL: if nonzero, delete data at θ = CAYDEL NRHO: delete NRHO densities at θ = CAYDEL. If NRHO=0, delete all densities at θ = CAYDEL
8, 9, etc	7E10.5	RHODEL(I), I=1, NRHO; the densities to be deleted at θ = CAYDEL

(Card types 7, 8, 9, etc., are repeated as required. If card 7 is blank, no data are to be deleted.)

The ANDIMX program produces a binary output tape.

COMBO: A PROGRAM TO COMBINE OPACITY TAPES

Purpose

COMBO is a FORTRAN IV code written for the UNIVAC-1108. Its purpose is to select temperature-density data sets from any of four possible types of input tapes and transmit these sets to one of two possible types of output tapes. Input tapes for COMBO can be output tapes from either DIAPHANOUS, ANDIMX, DENSER, or ANHIST.

The DENSER and ANDIMX codes have been incorporated into COMBO as subroutines. A DIAPHANOUS-type tape is first converted to a DENSER type and stored temporarily on a drum. An ANHIST-type tape is first converted to an ANDIMX type and similarly stored on a drum. Thus, all input is considered to be either DENSER or ANDIMX.

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      PROGRAM COMBO(INPUT,OUTPUT,TAPE10,TAPE11,TAPE12,TAPE13,TAPE3,
     1TAPE4,TAPE7,TAPE8,TAPE5=INPUT,TAPE6=OUTPUT)
C
C     PROGRAM COMBO: COMBINES TEMPERATURE-DENSITY DATA SETS FROM FOUR
C                    POSSIBLE TYPES OF INPUT TAPES. THESE ARE DIAPHANOUS
C                    (BINARY), ANDIMX (BINARY), DENSER(BCD) AND ANHIST
C                    (BINARY).
C
C          FOUR OR FEWER INPUT TAPES MAY BE SUPPLIED FOR A GIVEN RUN.
C          EACH OF THE FOUR TAPES CAN BE ANY ONE OF THE FOUR TYPES
C          MENTIONED ABOVE. IF A DIAPHANOUS TAPE IS SPECIFIED IT IS
C          FIRST CONVERTED TO A DENSER TAPE BY SUBROUTINE DENSER, WHICH
C          IS SIMILAR TO THE DENSER CODE, AND STORED TEMPORARILY ON A
C          DRUM.  SIMILARLY, AN ANHIST TAPE IS FIRST CONVERTED TO
C          ANDIMX TYPE BY SUBROUTINE ANDIMX (SIMILAR TO ANDIMX CODE) AND
C          STORED ON A DRUM.
C
C          TWO TYPES OF OUTPUT TAPES MAY BE PRODUCED. THE FIRST OF
C          THESE IS IDENTICAL TO A DENSER TAPE (EXCEPT FOR THE HEADER
C          AND LAST RECORDS) AND CAN BEPRODUCED ONLY IF ALL INPUT TAPES
C          ARE OF DENSER OR DIAPHANOUS TYPES. THE SECOND TYPE IS A
C          BINARY TAPE CONSISTING OF TEMPERATURE-DENSITY GROUPS
C          IDENTICAL TO THOSE FOUND ON EITHER ANDIMX (3 RECORD GROUPS)
C          OR DENSER (2 RECORD GROUPS) TAPES.
C
C          THE FIRST RECORD OF EACH OUTPUT TAPE CONTAINS EITHER THE
C          WORD 'COMBO1' OR 'COMBO2' FOLLOWED BY TWO DUMMY WORDS.
C          COMBO1 REFERS TO A BCD DENSER TYPE OUTPUT WHILE COMBO2
C          INDICATES A BINARY ANDIMX-DENSER COMBINATION. THE SECOND
C          RECORD IS 244 WORDS IN LENGTH GIVING THE ID INFORMATION
C          FOUND ON EACH INPUT TAPE PRECEEDED BY THE WORK 'TAPE I'
C          WHERE I=1,2,3 OR 4. IF FEWER THAN FOUR TAPES WERE INPUT, THE
C          REMAINING WORDS ARE BLANK.
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C          THE LAST 3 RECORDS ON AN OUTPUT TAPE ARE AS FOLLOWS:          COM  330
C            (1) THE INTEGER -8 FOLLOWED BY DUMMY WORDS.                 COM  340
C            (2) A LIST OF TEMPERATURE DENSITY PAIRS CONTAINED ON THIS   COM  350
C                TAPE AND THE INPUT TAPE 1,2,3 OR 4  FROM WHICH EACH     COM  360
C                CAME.                                                   COM  370
C            (3) THE INTEGER -5 FOLLOWED BY DUMMY WORDS (INDICATES END   COM  380
C                OF TAPE)                                                COM  390
C                                                                        COM  400
      INTEGER OUNIT(4)                                                   COM  480
      INTEGER TCLASS(2,2),CLASS(2),PO                                    COM  490
      INTEGER TYPE(4),UNIT(4),       OOUT,TOUT,POPT,TOPT,DSB,DRUM(4),TIDCOM  500
     .(4),HEAD(244),BLANK,IDAM(60),ID1(12) ,DENSOR,ANDMIX,ID2(10),ID3(10COM  510
     .),HEADIN(2,8),TTYPE(2,4),SITPE(2,4),SOUT                           COM  520
      REAL MINUS7                                                        COM  600
      LOGICAL FLAG(4),GLAG                                               COM  650
      DIMENSION RHO(4),THERM(38),A(5000),NSV(3,1000),ASV(2,1000),B(2)    COM  700
      DIMENSION TMX(4)                                                   COM  710
      DATA (DRUM(I),I=1,4)/3,4,7,8/,COMBO1/6HCOMBO1/,COMBO2/6HCOMBO2/,   COM  800
     .(TID(I),I=1,4)/6HTAPE 1,6HTAPE 2,6HTAPE 3,6HTAPE 4/,BLANK/1H /,    COM  810
     .DENSOR/6HDENSER/,ANDMIX/6HANDIMX/,EPS/1.E-6/,MINUS7/-7./,IM7/-7/   COM  820
      DATA (HEADIN(I,I),I=1,6 )/6HOUTPUT,6H TAPE ,6HIS OF ,6HDENSER,6H TCOM  830
     .YPE ,6H(BCD) /,(HEADIN(2,I),I=1,8)/6HOUTPUT,6H TAPE ,6HIS OF ,6HANCOM  840
     .DIMX,6H - COM,6HBO TYP,6HE (BIN,6HARY)  /,(HEADIN(I,I),I=7,8)/2*1HCOM  850
     . /                                                                 COM  860
      DATA((TTYPE(I,J),I=1,2),J=1,4)/6H DIAPH,6HANOUS ,6H   AND,3HIMX,6HCOM  870
     .   DEN,3HSER,6H   ANH,3HIST/,M8/-8/,M5/-5/                         COM  880
      DATA TMAX/1.E38/                                                   COM  890
      DATA((TCLASS(I,J),J=1,2),I=1,2)/6HUNCLAS,6HSIFIED,6HNEITHE,6HR     COM  900
     . /                                                                 COM  910
C                                                                        COM  912
C        V A R I A B L E   D E F I N I T I O N S                         COM  914
C                                                                        COM  916
C         NAME              MEANING                                      COM  918
C       A(5000)       BUFFER USED FOR TRANSMITTING DATA FROM I/P TAPES   COM  920
C                     TO O/P TAPE.                                       COM  922
C       ALAST1        SAME AS IN DENSER CODE                             COM  924
C       ANDMIX        CONTAINS THE ALPHANUMERIC WORD 'ANDIMX'            COM  926
C       ASV(2,1000)   STORAGE FOR THE ITH TEMPERATURE ( ASV(1,I)), AND   COM  928
C                     THE ITH DENSITY (ASV(2,I)) PUT OUT ON O/P TAPE.    COM  930
C                     USED IN SUMMARY PRINTOUT.                          COM  931
C       B(2)          SAME AS IN DENSER   (B(I) = TEMPERATURE )          COM  932
C       BLANK         CONTAINS ALPHANUMERIC BLANK.                       COM  933
C       CLASS(2)      SECURITY CLASSIFICATION AS READ FROM DATA CARD.    COM  934
C       COMBO1        ALPHANUMERIC WORD 'COMBO1'                         COM  935
C       COMBO2        ALPHANUMERIC WORD 'COMBO2'                         COM  936
C       D             DUMMY WORD USED TO SKIP RECORDS WHILE READING      COM  937
C                     BINARY TAPE.                                       COM  938
C       DENSOR        ALPHANUMERIC WORD 'DENSER'                         COM  939
C       DRUM(4)       THE LOGICAL DRUM UNITS USED FOR INTERMEDIATE       COM  940
C                     CONVERSION. (3,4,7 AND 8).                         COM  941
C       DSB           SUBSCRIPT INDICATING CURRENT DRUM BEING USED.      COM  942
C       EPS           AN EPISLON (1.E-6) TOLERANCE FOR COMPAIRING DATA   COM  943
C                     CARD TEMPERATURES TO THOSE READ FROM TAPES.        COM  944
C       FLAG(4)       FOR EACH I/P TAPE, INITALLY .FALSE., SET TRUE IF   COM  945
C                     END OF DATA IS REACHED BEFORE EXAUSTING SPECIFIED  COM  946
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C                    THETA-RHO SETS.                                       COM  947
C       GLAG         INITIALLY FALSE FOR EACH THETA-RHO SET. SET TRUE      COM  948
C                    IF ANY THETA-RHO SPECIFIED IS FOUND ON SOME I/P TAPECOM  949
C       HEAD(244)    STORAGE FOR THE HEADER RECORD O/P ON COMBO TAPE.      COM  950
C       HEADIN(2,8)  PRINTER HEADING FOR SUMMARY OUTPUT LIST.              COM  951
C       ID           ID WORD ON I/P TAPE. SHOULD BE EITHER 'DENSER' OR     COM  952
C                    'ANDIMX'.                                             COM  953
C       IDAM(60)     ID ARRAY FOUND ON ANDIMX TYPE TAPES.                  COM  954
C       ID1(12)      ID ARRAY FOUND ON DENSER TYPE TAPES.  EQUIVALENT TO   COM  955
C                    ID IN DENSER.                                         COM  956
C       ID2(10)      EQUIVALENT TO COMP IN DENSER.                         COM  957
C       ID3(10)      EQUIVALENT TO IZ IN DENSER.                           COM  958
C       IL           LENGTH OF THERMODYNAMICS DATA ON DENSER TYPE TAPE.    COM  959
C                    EITHER 8 OR 20.                                       COM  960
C       IM7          -7  (INTEGER)                                         COM  961
C       IPG          PAGE COUNTER FOR PRINTER O/P.                         COM  962
C       ISV          COUNTER ON ASV AND NSV ARRAYS.                        COM  963
C       ITP          SUBSCRIPT ON TAPES.                                   COM  964
C       JM           EQUIVALENT TO J IN DENSER.                            COM  965
C       K            THE PRESENT LOGICAL I/P UNIT.                         COM  966
C       LINE         LINE COUNTER FOR PRINTER O/P.                         COM  967
C       LLF          THE NUMBER OF BLANK LINES BETWEEN THE LAST PRINTED    COM  968
C                    LINE AND THE BOTTOM OF THE PAGE.                      COM  969
C       MINUS7       -7. (REAL)                                            COM  970
C       MM           SAME AS M IN DENSER                                   COM  971
C       M5           -5                                                    COM  972
C       M8           -8                                                    COM  973
C       NSV(3,1000)  STORAGE FOR THE ITH TAPE UNIT (NSV(1,I)). THE ITH     COM  974
C                    LOGICAL UNIT DESIGNATION (NSV(2,I)) AND THE ITH       COM  975
C                    TAPE TYPE. (SEE ASV)                                  COM  976
C       NTAPES       THE NUMBER OF I/P TAPES   (I.E. 4).                   COM  977
C       NZ           SAME AS NZ IN DENSER.                                 COM  978
C       OUNIT(4)     THE LOGICAL UNITS OF INPUT TAPES.                     COM  979
C       PO           FLAG INDICATING TYPE OF SECURITY CLASSIFICATION       COM  980
C                    PRINTOUT:   1  SECRET RESTRICTED DATA                 COM A981
C                                2  UNCLASSIFIED                           COM B981
C                                3  NO HEADING                             COM C981
C       POPT         PRINT OPTION:  0 COMPLETE PRINTOUT                    COM D981
C                                   1 PRINTOUT WITH NO TITLES              COM E981
C                                   2 NO PRINTOUT                          COM F981
C       RHO(4)       LOWER CUTOFF DENSITIES FOR EACH TAPE.  IF RHO(I)<0,   COM G981
C                    NO TEMP.-DENSITY PAIRS FOR THIS TEMP. ARE TAKEN       COM H981
C                    FROM TAPE I.                                          COM I981
C       R1           UPPER DENSITY CUTOFF, PRESENT TAPE.                   COM J981
C       R2           LOWER DENSITY CUTOFF, PRESENT TAPE.                   COM K981
C       STYPE(2,4)   ALPHANUMERIC IDENTIFICATION OF I/P TAPES  (EG. IF     COM L981
C                    TAPE 3 IS DENSER, STYPE(1,3)=   DEN AND               COM M981
C                    STYPE(2,3)=SER).                                      COM N981
C       TCLASS(2,2)  DATA OF WORDS 'UNCLASSIFIED' AND 'NEITHER'            COM O981
C       THERM(38)    THERMODYNAMICS DATA FROM ANDIMX TYPE TAPES. SAME AS   COM P981
C                    BB1,IBB AND BB2 IN ANDIMX CODE.                       COM Q981
C                    THERM(3)=TEMPERATURE                                  COM R981
C                    THERM(4)=DENSITY                                      COM S981
C       THETA        TEMPERATURE AS READ FROM DATA CARD.                   COM T981
C       TID(4)       ALPHANUMERIC 'TAPE I' IS IN TID(I).                   COM U981
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C                                                                       COM 1200
C          NOTE:   LEAVING POPT AND TOPT BLANK WILL RESULT IN COMPLETE  COM 1210
C                  PRINTOUT.                                            COM 1220
C                                                                       COM 1230
      DSB=1                                                             COM 1240
C                                                                       COM 1250
C     LOOP 10 DETERMINES TYPE OF TAPE AND CONVERTS TO DENSER  OR        COM 1260
C     ANDIMX IF NECESSARY.                                              COM 1270
C                                                                       COM 1280
      DO 10 I=1,NTAPES                                                  COM 1290
      II=TYPE(I)                                                        COM 1300
      GO TO (11,10,10,12),II                                            COM 1310
   11 CALL DENSER(UNIT(I),DRUM(DSB),TMX(I))                             COM 1320
      TYPE(I)=3                                                         COM 1325
   14 UNIT(I)=DRUM(DSB)                                                 COM 1330
      DSB=DSB+1                                                         COM 1340
      GO TO 10                                                          COM 1350
   12 CALL ANDIMX(UNIT(I),DRUM(DSB),TMX(I))                             COM 1360
      TYPE(I)=2                                                         COM 1365
      SOUT=1                                                            COM 1367
      GO TO 14                                                          COM 1370
   10 CONTINUE                                                          COM 1380
      DO 15 I=1,NTAPES                                                  COM 1382
   15 TYPE(I)=TYPE(I)-1                                                 COM 1385
C                                                                       COM 1390
C     IF TYPE 1 OUTPUT IS SPECIFIED, LOOP 20 INSURES THAT ALL INPUT     COM 1400
C     TAPES ARE OF TYPE 1 OR 3.                                         COM 1410
C                                                                       COM 1420
      IF(TOUT.EQ.2)GO TO 25                                             COM 1430
      DO 20 I=1,NTAPES                                                  COM 1440
      IF(TYPE(I).EQ.1.OR.TYPE(I).EQ.3) GO TO 20                         COM 1450
      WRITE(6,200)I,UNIT(I),TYPE(I)                                     COM 1460
      CALL EXIT                                                         COM 1470
   20 CONTINUE                                                          COM 1480
C                                                                       COM 1490
C     REWIND ALL TAPES                                                  COM 1500
C                                                                       COM 1510
   25 REWIND DOUT                                                       COM 1520
      DO 30 I=1,NTAPES                                                  COM 1530
      II=UNIT(I)                                                        COM 1540
   30 REWIND II                                                         COM 1550
C                                                                       COM 1560
C     WRITE COMBO ID RECORD                                             COM 1570
C                                                                       COM 1580
      GO TO(40,41),TOUT                                                 COM 1590
   40 WRITE(DOUT,500)COMBO1,D,D                                         COM 1600
      GO TO 42                                                          COM 1610
   41 WRITE(DOUT)COMBO2,D,D                                             COM 1620
C                                                                       COM 1700
C     CONSTRUCTION OF HEADER (ID) RECORD                                COM 1710
C                                                                       COM 1720
C     ALSO INSURES THAT FIRST WORD ON EACH I/P TAPE IS EITHER 'DENSER'  COM 1730
C     OR 'ANDIMX'.                                                      COM 1740
C                                                                       COM 1750
   42 DO 43 I=1,244                                                     COM 1760
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   43 HEAD(1)=BLANK
      DO 50 I=1,NTAPES
      J=ITPE(I)
      K=UNIT(I)
      L=61*(I-1)+1
      HEAD(L)=IID(I)
      GO TO(45,46),J
   45 READ(K)ID
      IF(ID.EQ.ANDMIX)GO TO 47
      WRITE(6,201)I,K,ID
      CALL EXIT
   47 READ(K)IDAM
      DO 48 LL=1,60
   48 HEAD(L+LL)=IDAM(LL)
      GO TO 50
   46 READ(K,600)ID,(ID1(M),M=1,12),NZ,(ID2(M),ID3(M),M=1,NZ)
      IF(ID.EQ.DENSOR)GO TO 49
      WRITE(6,202)I,K,ID
      CALL EXIT
   49 DO 51 LL=1,12
   51 HEAD(L+LL)=ID1(LL)
      HEAD(L+13)=NZ
      DO 52 LL=1,NZ
      M=L+12+2*LL
      N=M+1
      HEAD(M)=ID2(LL)
   52 HEAD(N)=ID3(LL)
   50 CONTINUE
C
C     WRITE THE HEADER RECORD ON THE O/P TAPE.
C
      GO TO(55,56),TOUT
   55 WRITE(UOUT,501)(HEAD(I),I=1,244)
      GO TO 57
   56 WRITE(UOUT)(HEAD(I),I=1,244)
   57 ISV=1
      IF(TOPT.NE.0)GO TO 53
      WRITE(6,208)
      CALL SHEAD(PO)
      WRITE(6,204)
      LINE=7
C
C     READ A TEMPERATURE (THETA) AND SET OF DENSITIES (RHO'S)
C
   53 READ(5,101)THETA,(RHO(I),I=1,NTAPES)
      EPT=EPS*THETA
      IF(THETA.EQ.-5000.)GO TO 95
      WRITE(6,214)THETA
      LINE=LINE+3
      GLAG=.FALSE.
C
C     FIND THETA ON THE FIRST I/P TAPE ON WHICH IT EXISTS.
C
      ITP=1
   59 IF(FLAG(ITP)) GO TO 90
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      IF(RHO(ITP).LT.0.)GO TO 90                                         COM 2275
   54 K=UNIT(ITP)                                                        COM 2280
      J=TYPE(ITP)                                                        COM 2290
      CALL RHODET(ITP,RHO,R1,R2)                                         COM 2295
      GO TO (60,80),J                                                    COM 2300
C                                                                        COM 2303
C     READS ANDIMX TYPE TAPES.                                           COM 2305
C                                                                        COM 2307
   60 READ(K)D                                                           COM 2310
      IF(D.EQ.MINUS7)GO TO 62                                            COM 2320
      IF(D.EQ.-5.)GO TO 70                                               COM 2330
      WRITE(6,203)K,D                                                    COM 2340
      CALL EXIT                                                          COM 2350
   62 READ(K)(THERM(I),I=1,38)                                           COM 2360
      IF(THERM(3)-EPT.LE.THETA) GO TO 65                                 COM 2362
   66 BACKSPACE K                                                        COM 2364
      BACKSPACE K                                                        COM 2366
      GO TO 90                                                           COM 2368
   65 IF(THERM(3).GE.(THETA-EPT).AND.THERM(3).LE.(THETA+EPT)) GO TO 64   COM 2370
   61 READ(K)D                                                           COM 2380
      GO TO 60                                                           COM 2390
   64 IF(THERM(4).GT.R1) GO TO 61                                        COM 2400
      IF(THERM(4).LT.R2) GO TO 66                                        COM 2405
      IF(TOPT.NE.0)GO TO 67                                              COM 2410
      LINE=LINE+9                                                        COM 2412
      IF(LINE.LE.46)GO TO 63                                             COM 2414
      LINE=LINE-9                                                        COM 2416
      LLF=46-LINE                                                        COM 2417
      IF(LLF.EQ.0)GO TO 630                                              COM 2418
      DO 631 I=1,LLF                                                     COM 2419
  631 WRITE(6,216)                                                       COM 2420
  630 CALL SHEAD(PO)                                                     COM 2421
      WRITE(6,208)                                                       COM 2422
      CALL SHEAD(PO)                                                     COM 2423
      WRITE(6,204)                                                       COM 2424
      WRITE(6,214)THETA                                                  COM 2425
      LINE=18                                                            COM 2426
   63 WRITE(6,212)ITP,OUNIT(ITP),(STYPE(J,ITP),J=1,2),(THERM(I),I=1,38) COM 2428
   67 WRITE(DOUT)IM7,D,D,D                                               COM 2430
      WRITE(DOUT)(THERM(I),I=1,38)                                       COM 2440
      READ(K)N,(A(I),I=1,N)                                              COM 2450
      WRITE(DOUT)N,(A(I),I=1,N)                                          COM 2460
      GLAG=.TRUE.                                                        COM 2465
   68 NSV(1,ISV)=ITP                                                     COM 2470
      NSV(2,ISV)=OUNIT(ITP)                                              COM 2480
      NSV(3,ISV)=TTYPE(1,ITP)                                            COM 2490
      GO TO (69,87),J                                                    COM 2495
   69 ASV(1,ISV)=THERM(3)                                                COM 2500
      ASV(2,ISV)=THERM(4)                                                COM 2510
      ISV=ISV+1                                                          COM 2520
      GO TO 60                                                           COM 2530
   70 REWIND K                                                           COM 2540
      FLAG(ITP)=.TRUE.                                                   COM 2545
      GO TO 90                                                           COM 2550
C                                                                        COM 2600
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C      READS DENSER RECORDS FOR TEMP-RHO GROUPS.
C
   80 READ(K,601)JM,MM,ULAST1,ALAST1,B(1),B(2),(A(KM),KM=1,9)
      IF(JM.EQ.-5)GO TO 70
      LL=2*MM+3*JM-2
      IF(B(1)-EPS.LT.THETA)GO TO 81
   83 BACKSPACE K
      GO TO 90
   81 IF(B(1).GT.(THETA-EPS).AND.B(1).LT.(THETA+EPS))GO TO 82
   88 READ(K,602)(A(L),L=1,LL)
      GO TO 80
   82 IF(A(2).GT.R1) GO TO 88
      IF(A(2).LT.R2) GO TO 83
      LLL=LL+10
      READ(K,602)(A(L),L=11,LLL)
      IF(TOPT.NE.0)GO TO 84
      IL=20
      IF(A(9).EQ.0.)IL=8
      IF(IL.EQ.8)LINE=LINE+3
      IF(IL.EQ.20)LINE=LINE+5
      IF(LINE.LE.46)GO TO 810
      LINE=LINE-3
      IF(IL.EQ.20)LINE=LINE-2
      LLF=46-LINE
      IF(LLF.EQ.0)GO TO 811
      DO 812 I=1,LLF
  812 WRITE(6,216)
  811 CALL SHEAD(PO)
      WRITE(6,208)
      CALL SHEAD(PO)
      WRITE(6,204)
      WRITE(6,214)THETA
      LINE=12
      IF(IL.EQ.20)LINE=14
  810 WRITE(6,205)ITP,OUNIT(ITP),(STYPE(J,ITP),J=1,2),(A(I),I=1,IL)
   84 GLAG=.TRUE.
      GO TO(85,86),TOUT
   85 WRITE(OOUT,502)JM,MM,ULAST1,ALAST1,B(1),B(2),(A(L),L=1,LLL)
      GO TO 68
   86 WRITE(OOUT)JM,MM,ULAST1,ALAST1
      WRITE(OOUT)B(1),B(2),(A(L),L=1,LLL)
      GO TO 68
   87 ASV(1,ISV)=B(1)
      ASV(2,ISV)=A(2)
      ISV=ISV+1
      GO TO 80
   90 ITP=ITP+1
      IF(ITP.LE.NTAPES)GO TO 59
      IF(GLAG)GO TO 92
      WRITE(6,206)THETA,(RHO(I),I=1,NTAPES)
   92 DO 91 I=1,NTAPES
      IF(.NOT.FLAG(I))GO TO 53
   91 CONTINUE
      WRITE(6,207)
   77 READ(5,101)THETA,(RHO(I),I=1,NTAPES)
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      IF(THETA.EQ.-5000.)GO TO 95                                      COM 2976
      WRITE(6,211)THETA,(RHO(I),I=1,NTAPES)                            COM 2979
      GO TO 77                                                         COM 2990
C                                                                      COM 3000
C     ALL INPUT GROUPS HAVE BEEN TRANSFERRED TO THE OUTPUT TAPE.       COM 3010
C                                                                      COM 3020
   95 ISV=ISV-1                                                        COMA3020
      IF(IOPT.NE.0)GO TO 950                                           COM 3021
      LLF=46-LINE                                                      COM 3022
      IF(LLF.EQ.0)GO TO 951                                            COM 3023
      DO 952 I=1,LLF                                                   COM 3024
  952 WRITE(6,216)                                                     COM 3025
  951 CALL SHEAD(PO)                                                   COM 3026
  950 GO TO(96,97),TOUT                                                COM 3033
   96 WRITE(UOUT,502)MB,MB,(A(I),I=1,30)                               COM 3040
      WRITE(UOUT,502)ISV,ISV,(A(I),I=1,30)                             COM 3045
      DO 98 I=1,ISV                                                    COM 3050
   98 WRITE(UOUT,504)(NSV(J,I),J=1,3),(ASV(J,I),J=1,2)                 COM 3060
      WRITE(UOUT,502)MS,MS,(A(I),I=1,30)                               COM 3070
      GO TO 99                                                         COM 3080
   97 WRITE(UOUT)MB,MB,(A(I),I=1,2)                                    COM 3090
      WRITE(UOUT)ISV,((NSV(J,I),J=1,3),(ASV(J,I),J=1,2),I=1,ISV)       COM 3100
      WRITE(UOUT)MS,MS,(A(I),I=1,2)                                    COM 3110
   99 END FILE UOUT                                                    COM 3120
      REWIND UOUT                                                      COM 3130
      DO 94 I=1,NTAPES                                                 COM 3140
      K=UNIT(I)                                                        COM 3150
   94 REWIND K                                                         COM 3160
      IF(POPT.EQ.2)CALL EXIT                                           COM 3170
C                                                                      COM 3200
C     PRINTOUT OF GROUPS COPIED                                        COM 3210
C                                                                      COM 3220
      LINE=0                                                           COM 3222
      IPG=1                                                            COM 3225
      WRITE(6,208)                                                     COM 3225
      CALL SHEAD(PO)                                                   COM 3227
      IF(POPT.EQ.1)GO TO 75                                            COM 3230
      WRITE(6,209)UOUT,(HEADIN(TOUT,I),I=1,8 ),IPG                     COM 3240
      LINE=6                                                           COM 3245
   75 DO 76 I=1,ISV                                                    COM 3250
      ITP=NSV(1,I)                                                     COM 3255
      LINE=LINE+2                                                      COM 3260
      IF(LINE.LE.46)GO TO 76                                           COM 3270
      CALL SHEAD(PO)                                                   COM 3272
      WRITE(6,208)                                                     COM 3280
      CALL SHEAD(PO)                                                   COM 3285
      LINE=0                                                           COM 3290
      IF(POPT.EQ.1)GO TO 76                                            COM 3300
      IPG=IPG+1                                                        COM 3310
      WRITE(6,209)UOUT,(HEADIN(TOUT,J),J=1,8),IPG                      COM 3320
      LINE=6                                                           COM 3325
   76 WRITE(6,210)(NSV(J,I),J=1,2),(STYPE(J,ITP),J=1,2),(ASV(J,I),J=1,2)COM 3330
      LLF=46-LINE                                                      COM 3340
      IF(LLF.EQ.0)GO TO 73                                             COM 3350
      DO 72 I=1,LLF                                                    COM 3360
```

```
   72 WRITE(6,216)                                                      COM 3370
   73 CALL SHEAD(PO)                                                    COM 3380
      WRITE(6,208)                                                      COM 3390
      CALL EXIT                                                         COM 3400
C                                                                       COM 6000
C     FORMATS                                                           COM 6010
C                                                                       COM 6020
  100 FORMAT(16I5)                                                      COM 6030
  101 FORMAT(5E12.8)                                                    COM 6040
  200 FORMAT(1H1,20X,50HOUTPUT TAPE WAS SPECIFIED AS DENSER TYPE BUT TAPCOM 6100
     .E ,I2, 9H ON UNIT ,I2,20H IS BINARY, OF TYPE ,I2)                 COM 6110
  201 FORMAT(1H1,20X,21HFIRST RECORD ON TAPE ,I2, 9H ON UNIT ,I2,5H WAS COM 6120
     .,A6,24H BUT SHOULD BE 'ANDIMX'.)                                  COM 6130
  202 FORMAT(1H1,20X,21HFIRST RECORD ON TAPE ,I2, 9H ON UNIT ,I2,5H WAS COM 6140
     .,A6,24H BUT SHOULD BE 'DENSER'.)                                  COM 6150
  203 FORMAT(1H1,20X,25HANDIMX TYPE TAPE ON UNIT ,I2,32H SHOULD HAVE -7.COM 6160
     . AS FIRST RECORD/21X, 8HBUT HAS ,1PE16.8)                         COM 6170
  204 FORMAT(1H0,35X,61HTHERMODYNAMICS RECORDS OF TEMP.-DENSITY GROUPS OCOM 6180
     .N OUTPUT TAPE//10X,8HI/P TAPE,10X,4HUNIT,10X,4HTYPE,36X,14HTHERMODCOM 6190
     .YNAMICS)                                                          COM 6200
  205 FORMAT(1H0,12X,I2,14X,I2,7X,2A6,2X,1P5E16.8/(52X,1P5E16.8/))      COM 6210
  206 FORMAT(1H0,10X,75HTHERE ARE NO TEMPERATURE-DENSITY GROUPS ON THESECOM 6220
     . I/P TAPES FOR TEMPERATURE ,1PE14.7/11X,27HAND LOWER CUTOFF DENSITCOM 6230
     .IES ,1P4E16.7)                                                    COM 6240
  207 FORMAT(1H1,10X,80HDATA HAS BEEN EXAUSTED ON ALL I/P TAPES, BUT THECOM 6250
     . DATA CARDS LISTED BELOW REMAIN:)                                 COM 6260
  211 FORMAT(1H0,5X,1P5E16.8)                                           COM 6270
  208 FORMAT(1H1)                                                       COM 6280
  209 FORMAT(1H0,44X,41HSUMMARY OF OUTPUT TAPE GENERATED ON UNIT ,I2//41COM 6300
     .X,8A6,31X,5HPAGE ,I2//20X,8HI/P TAPE,10X,4HUNIT,14X,4HTYPE,15X,11HCOM 6310
     .TEMPERATURE,15X,7HDENSITY/)                                       COM 6320
  210 FORMAT(1H0,22X,I2,14X,I2,11X,2A6,2(10X,1PE14.7))                  COM 6330
  212 FORMAT(1H0,12X,I2,14X,I2,7X,2A6,2X,1P5E16.8/52X,1P5E16.8/52X,1P4E1COM 6340
     .6.8,6X,I8/52X,5(8X,I8)/52X,5(8X,I8)/52X,2(8X,I8),1P3E16.8/52X,1P5ECOM 6350
     .16.8/52X,1P3E16.8)                                                COM 6360
  214 FORMAT(1H0,30X22HTEMPERATURE (THETA) = ,1PE14.7)                  COM 6370
  216 FORMAT(1H )                                                       COM 6375
  500 FORMAT(A6,2E9.4)                                                  COM 6450
  501 FORMAT(13A6)                                                      COM 6460
  502 FORMAT(2I4,13E9.4,/(14E9.4))                                      COM 6470
  504 FORMAT(2I4,A6,2E9.4)                                              COM 6480
  600 FORMAT(13A6/I2,(F6.4,I2))                                         COM 6500
  601 FORMAT(2I4,13E9.4)                                                COM 6510
  602 FORMAT(14E9.4)                                                    COM 6520
      END                                                               COM 8000
```

Temperature-density groups to be transmitted to the output tape are specified by supplying a temperature and a lower cutoff density for each input tape. Temperatures are supplied in increasing magnitudes. For each temperature, all temperature-density groups with densities greater than the first lower cutoff density are transmitted to the output tape from the first input tape. For the second input tape, all groups with densities less than the first cutoff and greater than the second are transmitted, etc., until all input tapes are exhausted.

Two types of output tapes may be produced. The first is a BCD tape identical to a DENSER tape (except for the header and last records) and can be produced only if all input tapes are DENSER or DIAPHANOUS types. The second is a binary tape consisting of temperature-density groups identical to those found on either ANDIMX tapes (if input is ANDIMX or ANHIST) or DENSER tapes (if input is DENSER or DIAPHANOUS).

Input for COMBO

Input Data Cards

CARD NO.	COLUMNS	FORMAT	DESCRIPTION
1		(16I5)	
	1-5	I5	Number of input tapes (≤ 4)
	6-10	I5	Logical unit, first I/P tape
	11-15	I5	Type*, first I/P tape
	16-20	I5	Logical unit, second I/P tape (if necessary
	21-25	I5	Type*, second I/P tape
	etc.		

*Type designators:
1 DIAPHANOUS
2 ANDIMX
3 DENSER
4 ANHIST

(continued)

CARD NO.	COLUMNS	FORMAT	DESCRIPTION
2		(5E12.8)	
	1-12	E12.8	Maximum temperature to copy from first I/P tape
	13-24	E12.8	Maximum temperature to copy from second I/P tape
	etc.		

NOTE: Data on card type 2 are applicable only when a tape is of type 1 or 4 (i. e., must first be converted to a type 3 or 2). Execution time can be reduced by converting only those temperature-density groups with temperatures less than some required maximum. If all temperatures are required, or if all tapes are of type 2 or 3, a blank card will suffice

CARD NO.	COLUMNS	FORMAT	DESCRIPTION
3		(16I5)	
	1-5	I5	Logical unit, output tape
	6-10	I5	Type of output tape: 1. BCD (similar to DENSER) 2. Binary (combination of DENSER and ANDIMX types)
	11-15	I5	Print option: 0. Complete printout 1. Complete printout without titles 2. No printout
	16-20	I5	Thermodynamics print option: 0. Print thermodynamics data for each group copied 1. Do not print thermodynamics
4		(2A6)	
	1-12	2A6	Type of security classification: If UNCLASSIFIED, UNCLASSIFIED DATA will print at the top and bottom of each page. If NEITHER, no classification information will be printed. A blank card or any other alphanumeric information will cause the SECRET/RD clause to be printed at the top and bottom of each page

(continued)

CARD NO.	COLUMNS	FORMAT	DESCRIPTION
		(5E12.8)	
5	1-12	E12.8	A temperature for conversion of data
	13-24	E12.8	A lowest density to convert at this temperature, first tape
	25-36	E12.8	A lowest density to convert at this temperature, second tape
	etc.		

NOTE: A negative density will cause the appropriate tape to be skipped for that temperature.

As many of card type 5 as required to specify all temperatures should be supplied. The last data card of a set should have -5000. as the temperature, signaling end-of-data

The code may be run using a deck setup as follows:

```
    ▽          ASG        X=2293
    ▽          ASG        A=(1st I/P tape)
    ▽          ASG        B=(2nd I/P tape)
                .
                .             etc.
                .
 (3)▽          ASG        E=(output tape)
 (1)▽F         ASG        2=100000
 (2)▽F         ASG        3=100000
 (2)▽F         ASG        4=100000
 (2)▽F         ASG        7=100000
 (2)▽F         ASG        8=100000
    ▽          XQT        CUR
               IN         X
               TRI        X
               TOC
   ▽N          HDG
    ▽          XQT        COMBO/A1
        (DATA CARDS)
```

1. Drum 2 is required if any I/P tape is of ANHIST type
2. One scratch drum is required for each I/P tape of either DIAPHANOUS or ANHIST type, 3 being the first drum used, 4 the second, etc.
3. Of course, the output tape can be any logical unit not used for I/P

The COMBO Program was written by R. Korts of General Atomic.

```
      SUBROUTINE ANDIMX(BIN,BOUT,IMX)
C     PROGRAM TO CONVERT HUEBNERS TAPE TO AN ANDY ACCEPTABLE FORMAT.
C
C
C     ORIGINALLY CODED BY LEW SCHALIT          JANUARY, 1967
C     MODIFIED ON JULY 7,1967, BY CHRIS IMES, TO DELETE SPECIFIED
C       TEMPERATURE-DENSITY DATA
C
C     THIS PROGRAM DOES NOT ACHIEVE THE SAME RESULTS AS 'ANDIMX'
C      IT IS A MODIFICATION OF ANDIMX TO BE USED ONLY WITH COMBO.
C
C     THIS VERSION MODIFIED BY R. KORIS, OCT, 1967 TO ACT AS A
C     SUBROUTINE TO COMBO PROGRAM.
C     MODIFICATIONS:
C           (1)  NO DATA CARDS READ BY ANDIMX. ANIN AND ANOUT ARE
C                SPECIFIED AS ARGUMENTS. (TITLE(I),I=1,52) IS
C                SPECIFIED IN DATA STATEMENT AS 'THIS PSUDO-ANDIMX TAPE
C                GENERATED BY ANDIMX SUBROUTINE OF COMBO' FOLLOWED BY
C                BLANKS. NO THETA-RHO SETS ARE DELETED.
C           (2)  ALL PRINTER OUTPUT REMOVED EXCEPT FOR ERROR MESSAGES.
C           (3)  CERTAIN SECTIONS OF CODE RELATING TO DELETION OF THETA
C                RHO SETS HAVE BEEN REMOVED.
C
C     THIS PROGRAM USES ANHIST-OUTPUT-TAPES AS INPUT DATA.
C     THIS PROGRAM ASSUMES THE HUEBNER-MADE-AT-LASL ANN TAPE HAS BEEN
C        CONVERTED TO AN 1108 TAPE BY J. CLOWS ANHIST PROGRAM.  THAT
C        PROGRAM READ ANN TAPES WITH ANY SIZE RECORD (E.G., EITHER A 35-
C        OR 37-WORD FIRST RECORD (AT EACH TEMPERATURE-DENSITY POINT),
C        AND VARIABLE SIZE SECOND RECORDS)  AND PRODUCED LOGICAL OUTPUT
C        RECORDS WITH A MINIMUM OF 253 WORDS.  THE FINAL RECORD OF THE
C        7094 TAPE WAS A 4-WORD ALL-ZERO RECORD.  ANHIST CONVERTED THIS
C        TO A 253-ZERO-WORD RECORD.
C
C     THIS PROGRAM WILL PRODUCE AN OUTPUT TAPE WHICH HAS
C                A) A FIRST RECORD OF: ANDIMX
C                B) A SECOND RECORD OF: 60 IDENTIFICATION WORDS
C                C) A SIGNAL RECORD OF: -7. (DATA FOLLOWS FOR A GIVEN
C                       TEMPERATURE-DENSITY POINT
C                D) A 38 WORD RECORD  (CAYT IS WORD(3), RHO IS WORD(4))
C                E) A RECORD WITH (NMAX+1) WORDS: NMAX,(MU(J),J=1,NMAX)
C
C                RECORDS (C,D,AND E) ARE THEN REPEATED. TEMPERATURES
C                AND DENSITIES ARE MONOTONIC. TEMPERATURES ARE LOWEST
C                AT THE BEGINNING OF THE TAPE.THE HIGHEST DENSITY FOR
C                A GIVEN TEMPERATURE IS THE FIRST DENSITY AT THAT
```

```
C                 TEMPERATURE.
C
C                 F) A SIGNAL RECORD OF: -5. SIGNIFIES END OF DATA.
C
C
C
C     CODE WILL READ ALL DATA ON THE ANHIST-OUTPUT-TAPE ANIN. THEN
C     PREVENT SPECIFIED (INPUT-CONTROLLED) TEMPERATURE-DENSITY DATA FROM
C     BEING WRITTEN ON THE ANDIMX-OUTPUT-TAPE ANOUT.
C
C
C     ***********                NOTE                          ***********
C     IF USE STANDARD INPUT UNIT=14, STANDARD OUTPUT UNIT=12, AND ALL
C     DATA ARE TO BE KEPT, TWO BLANK CARDS ARE REQUIRED TO END THE INPUT
C     SET AS SPECIFIED BELOW
C     ***********                                              ***********
C
C     INPUT NEEDED IS AT LEAST SEVEN CARDS WITH THE FOLLOWING
C        INFORMATION
C
C     1) 52 TITLE WORDS (PUNCHED ON 5 CARDS WITH 12 WORDS IN 12A6
C        FORMAT ON FIRST 4 TITLE CARDS AND 4 WORDS IN 4A5 FORMAT ON
C        FIFTH TITLE CARD)
C     2) A CARD SPECIFYING THE INPUT TAPE UNIT AND THE OUTPUT TAPE UNIT
C        WRITTEN WITH A FORMAT OF (I2,1X,I2)
C        IF THE INPUT TAPE UNIT SPECIFICATION FIELD IS BLANK, THE INPUT
C        TAPE IS ASSUMED TO BE ON UNIT 14
C        IF THE OUTPUT TAPE UNIT SPECIFICATION FIELD IS BLANK,THE OUTPUT
C        TAPE IS ASSUMED TO BE ON UNIT 12
C     3) IF DATA FOR ANY THETA-RHO SETS ARE TO BE DELETED, CARDS WITH
C        THE FOLLOWING INFORMATION MUST BE INPUT
C                    A) TEMPERATURE FOR WHICH DATA ARE TO BE DELETED, AND
C                       THE NUMBER OF RHO SETS WHICH ARE TO BE DELETED.
C                       (IN FORMAT (F10.4,8X,I2)).
C                    B) IF NUMBER OF RHO SETS TO BE DELETED IS ZERO, ALL
C                       DATA FOR THAT TEMPERATURE WILL BE DELETED.
C                    C) IF NUMBER OF RHO SETS TO BE DELETED IS SPECIFIED,
C                       CARDS (IN FORMAT (7E10.4)) CONTAINING THE DENSITIES
C                       INVOLVED MUST FOLLOW.
C                    D) A BLANK CARD SIGNIFIES END OF DATA.  IF NO THETA-
C                       RHO SETS ARE TO BE DELETED, A BLANK DATA CARD MUST
C                       FOLLOW THE SIX CARDS DESCRIBED ABOVE IN 1) AND 2).
C
C     ***********                WARNING                       ***********
C     CATT ASSUMED .GE. 100
C     CATT ASSUMED TO BE CLOSE TO A MULTIPLE OF 100 EV
C     ***********                                              ***********
C
C
      DIMENSION TITLE(60),B1(14), INPUT(10),SIGNAL(7),B2(11),IB(13)
     1,MU(2971),DTU(2971), MU2(2971), BB1(14), IBB(13), BB2(11)
     2,THETA(1000),DNSITY(1000),CAYTE(1000)
      DIMENSION CAYDEL(100), RHODEL(100,25), NRHO(100), ISAVE(100)
     1         ,CAYGON(50), RHOGON(50,25)
C
```

```
      REAL MU, MU2
      INTEGER BIN,BOUT
      INTEGER ANIN, ANOUT, DONE
C
C
      DATA X/-1967./, SIGNAL/-1.,-2.,-3.,-4.,-5.,-6.,-7./,DONE/0/,
     1 NEXT/1/,CATT/0./,MAXRHO/25/,ANDMX/6HANDIMX/
      DATA(TITLE(I),I=1,11)/6HTHIS P,6HSUDO-A,6HNDIMX ,6HTAPE G,6HENERAT
     *,6HED BY ,6HANDIMX,6H SUBRO,6HUTINE ,6HOF COM,2HBO/,(TITLE(I),I=12
     *,52)/41*1H /
C
C     B2(9) AND B2(10) ARE SET TO ZERO IN CASE ANHIST-OUTPUT-TAPES
C     CONTAIN 35-WORD FIRST RECORDS (RATHER THAN 37-WORD FIRST RECORDS)
C     AT EACH TEMPERATURE-DENSITY POINT.
      DATA B2(9), B2(10)/2*0./
C
C     M COUNTS THE NUMBER OF TEMPERATURES FOR WHICH DATA ARE TO BE
C       DELETED.
C     IDELET COUNTS THE NUMBER OF DENSITY SETS TO BE DELETED, PER
C       TEMPERATURE.
C     ISAVE(M) IS SET TO NONE IF NO DATA FOR CATTNO(M) IS TO BE WRITTEN
C       ON THE ANDIMX-OUTPUT-TAPE ANOUT.
C     KOUNT COUNTS TEMPERATURES FOR WHICH DATA ARE TO BE DELETED, AS
C       THEY ARE LOCATED ON ANIN.
C     J COUNTS RHOPTS, PER TEMPERATURE, FOR WHICH DATA ARE TO BE WRITTEN
C       ON ANDIMX-OUTPUT-TAPE ANOUT
C     KJ COUNTS TEMPERATURE-DENSITY SETS WRITTEN ON ANDIMX-OUTPUT-TAPE
C       ANOUT
C     JDELET IS SET TO NONE IF NO DELETIONS ARE TO BE MADE FOR A
C       TEMPERATURE THAT IS READ FROM ANIN.
C
      DATA M/0/, IDELET/0/, NONE/1/, ISAVE/100 * 0/, KOUNT/0/
      DATA J/0/, KJ/1/
C
      DATA MODIFY/6H THESE/, NOTDO/6H  NO  /, EPSILN/1.E-3/
      DATA ISAVET/0/, JDELET/0/, NRHO/100*0/
C
      EQUIVALENCE (ANIN,INPUT(1)),(ANOUT,INPUT(2)),(IMDONE,B1(1)),
     1(CATT,B1(3)),(MU(1),DTU(1)),(AWT,B1(2)),(RHO,B1(4)),
     2(CATTEE, B2(11))
C
    1 FORMAT (12A6)
C
    2 FORMAT (I2,1X,I2)
C
      ANIN=BIN
      ANOUT=BOUT
C                                                 REWIND ALL TAPES
      REWIND ANOUT
      REWIND ANIN
      REWIND 2
C
      WRITE(ANOUT)ANDMX,X,X
      READ (ANIN) (TITLE(KM),KM=53,60)
C                                                 WRITE TAPE TITLE
```

```
      WRITE (ANOUT)(TITLE(L2),L2=1,60)
  400 CONTINUE
      M=            M + 1
C
  410 CONTINUE
C     IF (M.EQ.1), NORMAL RUN, NO DELETIONS
        IF (M .EQ. 1) MODIFY = NOTDO
  480 CONTINUE
C
C
      READ (ANIN) B1,IB,(B2(LC),LC=1,10)
      IF(B1(3).GT.TMX) GO TO 101
C
C     CATTE STORES THE TEMPERATURE TO BE WRITTEN ON ANOUT.
C     CATTEE STORES THE TEMPERATURE READ FROM ANIN THAT WILL BE
C       WRITTEN AS B2(11) ON ANOUT.
C
      CATTE(KJ)=CAYT
      CATTEE = CAYT
C
      CAYT=     FLOAT (IFIX(CAYT/100. + .5 ) * 100 )
CAVEAT    ASSUMES TEMPERATURE .GE. (100-EPSILON)
      ICAYT=        CAYT
C
  415 CONTINUE
      DO 9 JK=1,MAXRHO
        IF (MODIFY .EQ. NOTDO) GO TO 450
        IF (ICAYT .EQ. ISAVET) GO TO 434
C
C     CHECK TO SEE WHETHER CAYT IS ONE FOR WHICH DATA ARE TO BE DELETED.
C
      DO 420 M2=1,M
        IF (ABS((CAYT-CAYDEL(M2))/CAYT) .LT. EPSILN) GO TO 430
  420 CONTINUE
      M2=           M
      JDELET=       NONE
      GO TO 450
C
C
C     A TEMPERATURE FOR WHICH DATA ARE TO BE DELETED HAS BEEN LOCATED.
  430 CONTINUE
      KOUNT=        KOUNT + 1
      JDELET=       0
      IDELET=       0
        IF (ISAVE(M2) .EQ. NONE) GO TO 431
      NNRHO=        NRHO(M2)
C
  434 CONTINUE
        IF (JDELET.EQ.NONE .OR. IDELET.EQ.NRHO(M2)) GO TO 450
  435 CONTINUE
      DO 440 M3=1,NNRHO
        IF (ABS((RHO-RHODEL(M2,M3))/RHO) .LT. EPSILN) GO TO 431
  440 CONTINUE
      GO TO 450
C
```

```
  431 CONTINUE
C     DELETE THETA-RHO DATA
      ISAVET=       CATT
      READ (ANIN) NOTUSE
      READ (ANIN) NOTUSE
      IDELET=       IDELET + 1
      READ (ANIN) NOTUSE, NOTUSE, CATGON(KOUNT), RHOGON(KOUNT,IDELET)
      GO TO 14
C
  450 CONTINUE
CAVEAT    ASSUMES .LE. 25=MAXRHO DENSITIES AT EACH TEMPERATURE
      THETA(KJ)=CATT
      DNSITY(KJ)=RHO
      WRITE (2)  B1,IB,B2
C     ANDIMX OUTPUT TAPES ALL HAVE 38 WORD FIRST RECORDS
C     RECORD 1 SAYS ANDIMX
C
      J=J+1
C
      READ(ANIN) NOTUSE
      READ (ANIN)  NMAX, (NOTUSE,I=1,NMAX),(DTU(I),I=1,NMAX)
C
      DO 5 I=1,NMAX
      U OF I = .3 + FLOAT(I-1) * .01
      MU(I)=RHO*DTU(I)*6.476E7/(CATTEE*(U OF I**3)*AWT)
C
C     CORRECTION FOR INDUCED EMISSION STILL PRESENT.
    5 CONTINUE
C
      ISAVET=CATT
      WRITE (2), NMAX,(MU(I),I=1,NMAX)
      KJ=KJ+1
C
   14 CONTINUE
C
C
C
      READ (ANIN) B1,IB,(B2(LC),LC=1,10)
      IF (IMDONE .EQ. 0) GO TO 101
      IF(B1(3).GT.TMX)GO TO 101
C
      CATTE(KJ)=CATT
      CATTEE = CATT
      CATT =    FLOAT (IFIX (CATT/100. +.5) * 100 )
      ICATT=CATT
        IF (ICATT.NE.ISAVET .AND. ISAVE(M2) .EQ. NONE) GO TO 460
        IF (ICATT .NE. ISAVET) GO TO 102
        IF (ISAVE(M2) .EQ. NONE) GO TO 431
        IF (MODIFY.EQ.NOTDO .OR. JDELET.EQ.NONE .OR. IDELET.EQ.NRHO(M2))
     1     GO TO 99
      GO TO 435
C
  101 CONTINUE
      DONE = NEXT
  102 CONTINUE
```

```
C     WRITE OUT ALL RECORDS FOR A GIVEN TEMPERATURE ON THE ANDIMX OUTPUT
C       TAPE.
C
        IF (MODIFY .EQ. NOTDO) GO TO 461
        IF (JDELET.NE.NONE .AND. IDELET.NE.NRHO(M2)) GO TO 600
  461 CONTINUE
      DO 7 I=1,J
      BACKSPACE 2
      READ (2) NMAX2, (MU2(K),K=1,NMAX2)
      BACKSPACE 2
      BACKSPACE 2
      READ (2) BB1,IBB,BB2
      BACKSPACE 2
      WRITE (ANOUT) SIGNAL (7), X, X
      WRITE (ANOUT) BB1, IBB ,BB2
      WRITE (ANOUT)  NMAX2, (MU2(K),K=1,NMAX2)
    7 CONTINUE
C
  460 CONTINUE
        IF (ISAVE(M2) .EQ. NONE) BB1(3)=CAYDEL(M2)
      IF(IDONE.EQ.NEXT) GO TO  100
      REWIND 2
      J=0
      GO TO 415
   99 CONTINUE
    9 CONTINUE
C
      WRITE (6,15)  THETA(KJ), (DNSITY(LM), LM=1,25)
   15 FORMAT (58H CHANGE MAXRHO=25. THERE ARE TOO MANY DENSITIES AT THET
     1A= , F10.0 /37H0THE FOLLOWING DENSITIES WERE READ IN/(1P10E13.7))
  499 CONTINUE
      CALL MERR
      RETURN
  100 CONTINUE
        IF (KOUNT .NE. M-1) GO TO 601
      WRITE (ANOUT) SIGNAL(5), X,X
      END FILE ANOUT
      REWIND 2
      REWIND ANIN
      REWIND ANOUT
      RETURN
C
C     E R R O R   E X I T S
C     A TEMPERATURE FOR WHICH DATA ARE TO BE DELETED HAS BEEN INPUT.
C       HOWEVER, THE INPUT DENSITY CANNOT BE FOUND ON THE ANIN TAPE.
  600 CONTINUE
      WRITE (6,650) CAYDEL(M2), (RHODEL(M2,M5), M5=1,NNRHO)
  650 FORMAT (64H1 A TEMPERATURE FOR WHICH DATA ARE TO BE DELETED HAS BE
     1EN INPUT. / 61H0 HOWEVER, THE INPUT DENSITY CANNOT BE FOUND ON THE
     2 ANIN TAPE / 11H0 CAYDEL = ,E12.6, 14H, RHODEL SET=  ,E12.6,
     3 (/37X,E12.6) )
      GO TO 499
C
  601 CONTINUE
C     ALL TEMPERATURES ON ANIN HAVE BEEN CHECKED AGAINST INPUT TEMPERA-
C       TURES FOR WHICH DATA ARE TO BE DELETED.  HOWEVER, NOT ALL THE
C       INPUT TEMPERATURES WERE FOUND.  CHECK FOR INPUT ERROR.
      WRITE(6,651)
  651 FORMAT(60H1 INPUT ERROR.  ALL VALUES OF CAYTNO WERE NOT FOUND ON A
     1NIN. )
      GO TO 499
      END
```

```
      SUBROUTINE DENSER(MIN,MOUT,IMX)
C
C     DIAPHANOUS EDITOR
C*    ALL DENSER RUNS MUST WRITE ON A TAPE IN EVEN PARITY -
C*    THIS IS DONE BY SPECIFYING THE K AND E OPTIONS ON THE TAPE ASSIGN CARD
C     DAPHNE WAS ORIGINALLY MODIFIED BY L. R. NORRIS TO READ A DIAPHANCUS
C     TAPE AND MAKE THIS INTO A CONDENSED TAPE IN ORDER TO SAVE SPACE
C
C
C     DENSER ,AS MODIFIED BY R. KORTS, OCT., 1967, TO BE A SUBROUTINE
C     TO COMBO.
C
C     THIS PROGRAM DOES NOT ACHIEVE THE SAME RESULTS AS 'DENSER'
C      IT IS A MODIFICATION OF DENSER TO BE USED ONLY WITH COMBO.
C
C
C     MIN, MOUT SPECIFIED AS SUBROUTINE ARGUMENTS.
C     IFILE=1
C     IWRIT=0
C     MEND=1
C
C     WRITE STATEMENTS, EXCEPT FOR ERROR MESSAGES, HAVE BEEN REMOVED.
C
C     VARIABLE NAME  MEANING
C
C     *** AUGEAS ***
C     DELEPJ (2000)  ENERGY CHANGE DURING A TRANSITION (EV)
C     DELEPS (1300)  IONIZATION POTENTIAL OF A STATE (EV)
C     EIN (15)       ENERGY OF GROUND STATE OF AN IONIZATION LEVEL
C     EPSD (1300)    SAME AS EPS IN DIAPHANOUS
C     FPC (3, 3, 3)  FRACTIONAL PERCENTAGE COEFFICIENT FOR TRANSITION BETWEEN
C                    SPLIT CONFIGURATIONS
C     IJD (2000)     IDENTIFICATION NUMBER OF INITIAL STATE ASSOCIATED WITH A
C                    TRANSITION
C     ISPLIT (15, 40)IDENTIFICATION OF A SPLIT CONFIGURATION
C     MERGED (15, 40)TRUE IF THIS CONFIGURATION IS THE AVERAGE OF SOME OTHER
C                    CONFIGURATIONS IN THE TABLE
C     MJD (2000)     NUMBER OF ELECTRONS IN LEVEL FROM WHICH ONE IS REMOVED IN
C                    THIS TRANSITION
C     NFD (1300)     SAME AS NF IN DIAPHANOUS
C     NJD (2000)     PRINCIPAL QUANTUM NUMBER (OR REDUCED QUANTUM NUMBER) OF
C                    ELECTRON REMOVED IN THIS TRANSITION.
C     NQ (6, 15, 40) NUMBER OF ELECTRONS IN AN ELECTRON LEVEL IN A CONFIGURATION
C     NRMAX (15)     NUMBER OF CONFIGURATIONS AT AN IONIZATION LEVEL
C     NRSAVE (1300)  CONFIGURATION IDENTIFICATION OF A STATE
C     NSAVE (1300)   QUANTUM NUMBER OF OUTER ELECTRON, IF BEYOND TABLE, OF A
C                    STATE
```

```
C       QD (1500)         SAME AS G IN DIAPHANOUS
C       QWT (15, 40)      DEGENERACY OF A CONFIGURATION
C       W0 (15, 40)       COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                         CONFIGURATION
C       W1 (15, 40)       COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                         CONFIGURATION
C       W2 (15, 40)       COEFFICIENTS IN QUADRATIC FOR DETERMINING ENERGY OF THIS
C                         CONFIGURATION
C       *** DIAPH2 ***
C       BE (100)          SAME AS BEJ, INDEXED BY (NF + 1) FOR INITIAL STATE
C       BEJ (1600)        PARAMETER DETERMINING LINE WIDTH FOR A TRANSITION
C       C (10)            CONCENTRATION OF AN ELEMENT (ATOMS/ATOM)
C       COM (12)          COMMENT CARD IN FORMAT 12A6
C       DELE (100)        SUM OF DELI AT PREVIOUS IONIZATION LEVELS (EV)
C       DELEPJ (2200)     ENERGY CHANGE DURING A TRANSITION (EV)
C       DELEPS (1500)     IONIZATION POTENTIAL OF A STATE (EV)
C       DELI (100)        PRESSURE IONIZATION AT AN IONIZATION LEVEL (EV)
C       EPS (1500)        ENERGY OF A STATE, USUALLY REFERRED TO THE ENERGY OF THE
C                         GROUND STATE OF THE NEUTRAL ATOM (EV)
C       EPSPRM (1500)     ENERGY OF A STATE AFTER REDUCTION DUE TO PRESSURE IONIZA-
C                         TION (EV)
C       EX (100)          SAME AS EXJ, INDEXED BY (NF + 1) FOR INITIAL STATE
C       EXJ (1600)        PARAMETER DETERMINING LINE LOCATIONS FOR A TRANSITION
C       GAMBLK (10)       ARRAY OF GAMMA
C       IJ (2200)         IDENTIFICATION NUMBER OF INITIAL STATE ASSOCIATED WITH A
C                         TRANSITION
C       MAKEZ (1500)      IDENTIFICATION OF STATE TO BE ELIMINATED
C       MJ (2200)         NUMBER OF ELECTRONS IN LEVEL FROM WHICH ONE IS REMOVED IN
C                         THIS TRANSITION
C       NEW (2200)        ORIGINAL IDENTIFICATION NUMBER OF A TRANSITION
C       NF (1500)         NUMBER OF FREE ELECTRONS FOR A STATE
C       NJ (2200)         TOTAL QUANTUM NUMBER (OR REDUCED QUANTUM NUMBER) OF ELEC-
C                         TRON REMOVED DURING A TRANSITION
C       NLAST (10)        INDEX NUMBER OF LAST STATE IN TABLE FOR AN ELEMENT
C       PHI (2200)        STRENGTH OF EDGE DUE TO THIS TRANSITION
C       Q (1500)          DEGENERACY OF A STATE
C       R (1500)          FIRST PROPORTIONAL TO LOG POPULATION AND THEN TO POPULATION
C                          OF A STATE
C       RS (10)           FIRST MAXIMUM R, THEN SUM OF R'S, FOR AN ELEMENT
C       SMALLP (1500)     POPULATION OF A STATE
C       TESTJ (2200)      LOWEST VALUE OF MU AT WHICH THE ABSORPTION COEFFICIENT IS
C                         AFFECTED BY THE LINE SERIES FOR THIS TRANSITION
C       TKBLK (10)        ARRAY OF KT
C       U (5)             COEFFICIENTS IN GAUSSIAN INTEGRATION
C       R (5)             COEFFICIENTS IN GAUSSIAN INTEGRATION
C       UOLD (2200)       LOCATION OF EDGE DUE TO THIS TRANSITION (EV/EV)
C       UPRM (2200)       LOWERED EDGE TO APPROXIMATE HIGH LINES (EV/EV)
C       W (10)            ATOMIC WEIGHT OF AN ELEMENT
C       Z (10)            ATOMIC NUMBER OF AN ELEMENT
C       *** DIAPER ***
C       AMU (1000)        ABSORPTION COEFFICIENT AT A PARTICULAR VALUE OF MU(.6 .LE.
C                         MU .LE. 15) (PER CM)
C       BMU (1000)        BOTTOM OF EDGE OCCURING AT A PARTICULAR VALUE OF MU(MU .GT.
C                          15)(PER CM)
C       ID (12)           COMMENT CARD
```

```
C       TMU (1000)       TOP OF EDGE OCCURING AT A PARTICULAR VALUE OF U (U>15) (PER
C                        CM)
C       *** SPECTRA ***
C       DEFECT (100, 4)QUANTUM DEFECT INDEXED BY THE IONIZATION LEVEL AND L + 1
C       DELEPJ (3500)    SAME AS DELEPJ IN DIAPHANOUS
C       EPSD (1750)      SAME AS EPS IN DIAPHANOUS
C       DELEPS (1750)    SAME AS DELEPS IN DIAPHANOUS
C       IJU (3500)       SAME AS IJ IN DIAPHANOUS
C       IONZC (100)      ZCORE FOR AN IONIZATION LEVEL
C       L (19)           L FOR AN ELECTRON LEVEL
C       LIN (10)         LEVEL AT WHICH AN ELECTRON IS BEING ADDED
C       LOUT (10)        LEVEL AT WHICH AN ELECTRON IS BEING REMOVED
C       MJU (3500)       SAME AS MJ IN DIAPHANOUS
C       N (19)           N FOR AN ELECTRON LEVEL
C       NE (92, 19)      NUMBER OF ELECTRONS PER ELECTRON LEVEL IN THE GROUND STATE
C                        OF AN IONIZATION LEVEL
C       NFD (1750)       SAME AS NF IN DIAPHANOUS
C       NJU (3500)       SAME AS NJ IN DIAPHANOUS
C       QD (1750)        SAME AS Q IN DIAPHANOUS
C
        REAL LONG
        REAL LENGTH
        INTEGER NEWID, BLANK
        DIMENSION NEWID(12)
        DIMENSION ID(12), A(20), B(2), U1(150), GARY(150), AMU(150),
       1          DAVE (150),DUMMY(30)
        DIMENSION THETA(5000), XGAMMA(5000), RHO(5000)
        DIMENSION U2(1500), BMU(1500), TMU(1500), COMP(10), IZ(10)
        DATA DENSOR/6HDENSER /
        DATA IFILE/1/,IWRIT/0/,MENU/1/
        DATA INDEXA / 1/
        DATA LRN / 1 / , DUMMY / 30*0. /
        DATA IFILE1 / 0 / , BLANK / 6H       /
C
      1 CONTINUE
C
C       MENU        IF (MENU .EQ. 0) ANOTHER SADY TAPE IS READ
C                   IF (MENU .NE. 0) THE RUN TERMINATES
C       IFILE       IF (IFILE .NE. 0) NO END OF FILE MARKER IS PUT ON AFTER
C                      THIS DIAPHANOUS TAPE HAS BEEN READ
C                   IF (IFILE .EQ. 0) AN END OF FILE MARKER IS PUT ON AFTER
C                      THIS TAPE HAS BEEN READ
C       IWRIT       IF (IWRIT .NE. 0) THE DIAPHANOUS INPUT TAPE IS EDITED
C                   IF (IWRIT .EQ. 0)THE DIAPHANOUS INPUT TAPE IS NOT EDITED
C
C
C       MIN         IS THE INPUT TAPE UNIT.  MIN MUST BE READ FOR EVERY
C                      INPUT TAPE TO BE READ
C
C       ALL DENSER TAPES MUST BE WRITTEN IN 556 BPI -
C       THIS IS ACCOMPLISHED BY SPECIFYING THE H OPTION ON THE TAPE
C       ASSIGNMENT CARD
C
C
        READ (5,8000) NZ, (IZ(K), COMP(K), K=1,NZ)
```

```
 8000 FORMAT (I2, 8X, 7(I2, 2X, F6.4))
      READ (5,8005) (NEWID(I),I=1,12)
 8005 FORMAT (12A6)
      REWIND MIN
      IRCD = 0
      NRCD = 0
      IDMU2 = 1500
C
      IF (IWRIT .NE. 0)
     1WRITE (6,9990)
      READ(MIN) A(1)
      IF (A(1))25,999,999
   25 IF(A(1)+1.) 999,2500,999
 2500 CONTINUE
      NRCD = NRCD + 1
      READ (MIN) (ID(I),I=1,12)
      IF (NEWID(1) .EQ. BLANK) GO TO 27
      DO 28 I=1,12
      ID(I) = NEWID(I)
   28 CONTINUE
   27 CONTINUE
      IF (IFILE1 .NE. 0) GO TO 26
      WRITE (MOUT,3) DENSOR, (ID(K),K=1,12), NZ, (COMP(K),IZ(K),K=1,NZ)
    3 FORMAT (13A6/I2,(F6.4,I2))
      IRCD = IRCD + 2
   26 CONTINUE
      NRCD = NRCD + 1
      READ(MIN) A(1)
      IF (IWRIT .NE. 0)
     1WRITE (6,9995) A(1)
      IF(A(1)+2.) 999,3002,999
 3002 CONTINUE
      NRCD = NRCD + 1
   32 READ (MIN) (B(I),I=1,2)
      IF(B(1).GT.TMX) GO TO 155
      THETA (INDEXA)=B(1)
      XGAMMA(INDEXA)=B(2)
      J = 2
      M = 6
      ULAST1 = 0.
      ALAST1 = 0.
      U2(J) = 0.
      GARY(1) = 0.
      DAVE(1) = 0.
      TK = B(1)
      GAMMA = B(2)
      NRCD = NRCD + 1
   34 READ(MIN) A(1), A(2)
      UX = A(1)
      UY = A(2)
      NRCD = NRCD + 1
      IF(UX + 3.) 35,65,35
   35 IF(UX + 4.) 40,75,40
   40 IF(UX + 6.) 55,45,55
   45 READ(MIN) A(1), A(2)
```

```
      IF (IWRIT .NE. 0)
     1WRITE (6,9000) A(1),A(2)
      U1(M) = A(1)
      AMU(M) = A(2)
      M = M+1
      UX = A(1)
      UY = A(2)
      NRCD = NRCD + 1
      IF(UX .LE. 0.) GO TO 4500
      ULAST = UX
      ULAST1 = UX
      ALAST1 = UY
      AKLAST = UY
      GO TO 34
 4500 CONTINUE
      REWIND MIN
      CALL EXIT
   55 U1(M) = UX
      AMU(M) = UY
      M = M+1
      GO TO 34
   65 READ(MIN) A(1), A(2), A(3)
      UX = A(1)
      UY = A(2)
      UZ = A(3)
      NRCD = NRCD + 1
      IF(UX + 4.) 70,74,70
   70 U2(J) = UX
      BMU(J) = UY
      TMU(J) = UZ
      J = J+1
      IF(J-IDMU2) 65,65,72
   72 CONTINUE
   73 READ(MIN) A(1), A(2), A(3)
      UX = A(1)
      UY = A(2)
      UZ = A(3)
      NRCD = NRCD + 1
      IF(UX + 4.) 73,74,73
   74 ULAST=U2(J-1)
      AKLAST=TMU(J-1)
   75 CONTINUE
      M = M - 1
      IF (IWRIT .NE. 0)
     1WRITE (6,9980) (U1(K),K=6,M)
      IF (IWRIT .NE. 0)
     1WRITE (6,9982) (AMU(K),K=6,M)
      IF (DAVE(1) .NE. 0.) CALL MERR
      READ(MIN) (A(JM), JM=1,8)
    4 FORMAT (1H )
      RHO(INDEXA)=A(2)
      INDEXA=INDEXA+1
      IF(U2(2) .EQ. 0.) GO TO 76
      J = J - 1
      IF (IWRIT .NE. 0)
```

```
     1WRITE (6,9984) (U2(K),K=2,J)
      IF (IWRIT .NE. 0)
     1WRITE (6,9986) (BMU(K),K=2,J)
      IF (IWRIT .NE. 0)
     1WRITE (6,9988) (TMU(K),K=2,J)
   76 CONTINUE
      WRITE (MOUT,2) J, M, ULAST1, ALAST1, B(1), B(2), (A(JM),JM=1,20),
     1               (U1(K),K=6,M), (AMU(K),K=6,M), (U2(K),K=2,J),
     2               (BMU(K),K=2,J), (TMU(K),K=2,J)
      NRCD = NRCD + 1
      IRCD1 = 11 + 2 * (M - 5) + 3 * (J - 1)
      IRCD2= IRCD1 / 14
      IRCD14 = IRCD2* 14
      IF (IRCD1 .GT. IRCD14) IRCD2= IRCD2 + 1
      IRCD = IRCD + 1 + IRCD2
      READ (MIN) A(1)
      IF (IWRIT.NE.0) WRITE (6,9996) A(1)
      UX = A(1)
      NRCD = NRCD + 1
      IF(UX + 2.) 77,32,999
   77 IF(UX + 5.) 999,155,999
  155 CONTINUE
C
      NRCD = NRCD + 1
C     THE ABOVE RECORD COUNT INCLUDES THE EOF RECORD
      IFILE1 = IFILE
      LONG = FLOAT(NRCD) * .0625
      LENGTH = FLOAT(IRCD) * .0658
      I = -5
      WRITE (MOUT,2) I, LRN, DUMMY
      IRCD = IRCD + 2
 8007 FORMAT (58H0THE DIAPHANOUS TAPE HAS BEEN CONDENSED SUCCESSFULLY FR
     1OM , F10.2,10H FEET WITH, I6, 21H PHYSICAL RECORDS TO ,F9.2,/10H0F
     2EET WITH,I5,18H PHYSICAL RECORDS.)
      ENDFILE MOUT
      IF (MEND .EQ. 0) GO TO 1
      REWIND MIN
      REWIND MOUT
      INDEXA=INDEXA-1
      RETURN
  999 CONTINUE
      WRITE (6,9901)
 9901 FORMAT (53H THERE IS AN ERROR IN THIS RUN. MERR HAS BEEN CALLED.)
      CALL MERR
C
C     *****************  F O R M A T S  *********************
   15 FORMAT  (42H 2ND SET OF DIAPHANOUS DATA HAS MORE THAN I3, 19H ENTR
     1IES.  THETA = F7.2, 8H, GAMMA=1PE10.5,20H, NO GOOD ABOVE U = 0PF6.
     31)
 9000 FORMAT(9H0 ULAST = 1PE15.7, 3X 8HAKLAST = E15.7)
 9002 FORMAT(1P10E12.5)
 9980 FORMAT(10H0 U1 ARRAY // (1P10E12.5))
 9982 FORMAT(11H0 AMU ARRAY // (1P10E12.5))
 9984 FORMAT(10H0 U2 ARRAY //(1P10E12.5))
 9986 FORMAT(11H0 BMU ARRAY // (1P10E12.5))
 9988 FORMAT(11H0 TMU ARRAY // (1P10E12.5))
 9990 FORMAT(1H1)
    2 FORMAT (2I4, 13E9.4, / (14E9.4))
 9995 FORMAT(10H  SIGNAL = F6.1)
 9996 FORMAT(10H1 SIGNAL = F6.1)
 9997 FORMAT(6H ZBAR=F8.4, 1X 4HRHO=1PE11.5, 2X 2HP=E11.5, 2X 2HE=E11.5,
     1 2X 5HKROS=E11.5, 2X 6HKPLNK=E11.5, 2X 5HEION=E11.5, 2X 5HEGAM=
     20PF9.3)
 9998 FORMAT(9H0 THETA = 1PE15.7, 3X 7HGAMMA = E15.7)
 9999 FORMAT(1H0, 12A6)
      END
```

```
      SUBROUTINE RHODET(ITP,RHO,R1,R2)                                  HDT   10
C                                                                       HDT   20
C     DETERMINES THE UPPER (R2) AND LOWER (R1) RANGES FOR RHO ON TAPE   HDT   30
C     ITP.                                                              HDT   40
C                                                                       HDT   50
      DATA RMAX/1.E38/                                                  HDT   65
      DIMENSION RHO(1)                                                  HDT   60
      R2=RHO(ITP)                                                       HDT   70
      IF(ITP.GT.1)GO TO 9                                               HDT   80
    6 R1=RMAX                                                           HDT   90
      RETURN                                                            HDT  100
    9 II=ITP                                                            HDT  110
    8 II=II-1                                                           HDT  120
      IF(II.LT.1)GO TO 6                                                HDT  130
      IF(RHO(II).LT.0.)GO TO 8                                          HDT  140
      R1=RHO(II)                                                        HDT  150
      RETURN                                                            RDT  160
      END                                                               RDT  500
```

```
      SUBROUTINE SHEAD(I)                                               SHD   10
C                                                                       SHD   20
C     PRINTS APPROPRIATE CLASSIFICATION HEADING                         SHD   30
C                                                                       SHD   40
      GO TO (10,20,30),I                                                SHD  100
   10 WRITE(6,200)                                                      SHD  110
      GO TO 30                                                          SHD  120
   20 WRITE(6,201)                                                      SHD  130
   30 RETURN                                                            SHD  140
  200 FORMAT(1H0,32X,67H*** S E C R E T / R E S T R I C T E D   D A T A SHD  150
     .   G R O U P  1 ***)                                              SHD  160
  201 FORMAT(1H0,47X,40H*** U N C L A S S I F I E D   D A T A ***)      SHD  170
      END                                                               SHD  500
```

DIANTC: A DIANE TRANSFER PROGRAM (TAPE TO CARDS OR TAPE)

The DIANTC program was coded to read a DIANE binary data tape file and do one of two input-controlled operations: (1) punch DIANE data cards or (2) write a DIANE BCD card-image data tape. The card image tape is written in even parity at 556 BPI in IBM-compatible BCD format, and it may contain several files (written by repeated executions of the DIANTC program).

The DIANTC program contains five formatted (BCD) write statements. They and their respective formats are as follows, where MOUT is defined as the logical tape unit on which the output tape is mounted:

```
    WRITE(MOUT, 3) IDA
  3 FORMAT(I12)
    WRITE(MOUT, 4)(ID(II), II=1, 12)
  4 FORMAT(12A6)
```

The two above write statements are used once to write identification data at the beginning of each file on the DIANTC output tape. The named variables are discussed below or are clear from context.

```
    WRITE(MOUT, 5)HNUT, FNWD
  5 FORMAT(6E12. 7)
```

The above write statement is used to write the first of two records preceding each frequency group.

Name variables are discussed below.

```
    WRITE(MOUT, 7)X1, X2, IX
  7 FORMAT(2E12. 7, 49X, I3, 4H    0)
```

The above write statement is used to write the second of two records preceding each frequency group.

```
    WRITE(MOUT, 6)((BUFS(IWD), IWD=KMIN, KMAX), IX, KK)
  6 FORMAT(6E12. 7, 1X, I3, I4)
```

The above write statement is used repetitively to write the data for each frequency group.

The code punches data cards, if it does not write a card-image tape, in the same manner and with the same formats that it uses to write the card-image tape. One may edit any file of the DIANTC card image output tape by using the EDIANE program, which is in FORTRAN IV language. One may also use either the output data cards or the output card image tape to write a binary DIANE-format tape using the program DIANTC, which is in FORTRAN IV language.

Input for DIANTC

DIANTC requires no card input. It is a subroutine with two input parameters, the meaning of which follows:

PARAMETER	VALUE	MEANING
UNIT	Variable	UNIT specifies the logical unit on which the input DIANE binary tape is mounted
IBIN0	0	If IBIN0 =0, the code assumes the input DIANE tape is written in binary with a binary identification record (ID array), and it punches cards
	1	If IBIN0 =1, the code assumes the input DIANE tape is written in binary with a BCD (formatted) identification record, and it punches cards
	>1	If IBIN0 > 1 the code assumes the input DIANE tape is written in binary with a binary identification record, and it does one of two things:
	2	1. If IBIN0 =2, the code writes a BCD card image tape on unit MOUT= IBIN0 +10=12
	>2	2. If IBIN0 > 2, the code writes two BCD card image tapes on units MOUT= IBIN0 +10 and MOUT2=MOUT+1

The code rewinds the input DIANE binary tape and the output BCD tape, if written, only when IBIN0 $\leq$ 2.

```
      SUBROUTINE DIANIC(M,N)
C
C     NO EXTRA DATA CARDS ARE REQUIRED TO RUN DIANIC
C
C     OUTPUT CARD FORM IS AS FOLLOWS
C
C     1       I12      1 - 12     IDA        12-DIGIT IDENTIFICATION
C                                               NUMBER
C     2       12A6     1 - 72     ID         HEADING FROM IDENTIFICATION
C                                               (HEADER) CARD
C     3       E12.7    1 - 12     HNUT       NUMBER OF FREQUENCY GROUPS
C     3       E12.7    13 - 24    FNWD       NUMBER OF WORDS/FREQUENCY
C                                               GROUP
C     4       E12.7    1 - 12     X1         IF X1 .LT.0., INDICATES
C                                               THAT THE GHET ABSORPTION
C                                               COEFFICIENTS FOLLOW
C                                            IF X1.GT.0., THEN X1 IS THE
C                                               VALUE OF THE LOWER END
C                                               OF A FREQUENCY BAND
C     4       E12.7    13 - 24    X2         NUMBER OF TEMPERATURES
C     5       E12.7    1 - 12     BUFS(IWD),
C                                 IWD=1      LN THETA
C     5       E12.7    13 - 24    BUFS(IWD),
C                                 IWD=2      NUMBER OF TAU'S
C     5       6E12.7   1ST CARD: BUFS(IWD),
C                       5 - 72    IWD=3,NWD     LN KR, LN KP, LN TAU,
C                                               LN KR, LN KP,...
C                      SUCCEEDING
C                      CARDS:
C             I2       75 - 76    IX         2-DIGIT SEQUENCING NUMBER:
C                                               INDICATES THE ORDER
C                                               NUMBER OF EACH FREQUENCY
C                                               GROUPING SET
C             I3       78 - 80    KK         3-DIGIT SEQUENCING NUMBER:
C                                               INDICATES CARD NUMBER
C                                               WITHIN A PARTICULAR
C                                               FREQUENCY GROUPING SET
C
      DIMENSION  ID(12), BUFS(1000)
      DIMENSION IDENT(2)
      DATA IDENT/6HBINARY,5H BCD /
      INTEGER UNIT
      IBINU = N
      UNIT = M
    3 FORMAT  (I12)
    4 FORMAT  (12A6)
    5 FORMAT  (6E12.7)
    6 FORMAT(6E12.7, 1X I3, I4)
    7 FORMAT(2E12.7, 49X I3, 4H    0)
    8 FORMAT(38H PUNCHING IS COMPLETED NO. OF CARDS = ,I5)
 7009 FORMAT (46H THE CARD COUNT DOES NOT INCLUDE THE RUN CARD.)
 7000 FORMAT (I12,12A6)
 7001 FORMAT (1H0,25X,20H DIANTC, RUN ON UNIT,I3,6H WITH ,A6,45H TAPE ID
```

```
     1ENTIFICATION, COMPLETED SUCCESSFULLY./1H1)
         IF (IBINO .EQ. 1) READ (UNIT,7000) IDA, (ID(I), I=1,12)
         IF (IBINO .EQ. 0) READ (UNIT) IDA, (ID(I), I=1,12)
C
C      IF (IBINO.GT.1) WRITE CARD IMAGE (BCD) TAPE ON UNIT MOUT=IBINO+10
C       IF (IBINO .GT. 2)  WRITE BCD (CARD IMAGE) TAPES ON UNITS
C        MOUT = IBINO+10  AND MOUT2 = MOUT+1.
C
        IF (IBINO .GT. 1) GO TO 100
      PUNCH 3, IDA
      PUNCH 4, (ID(I), I=1,12)
  101 CONTINUE
      READ (UNIT) HNUT, FNWD
        IF (IBINO .GT. 1) GO TO 102
      PUNCH 5,  HNUT, FNWD
  103 CONTINUE
      NWD = FNWD
      NVECES = HNUT + 1.
      IF (NWD .GT. 1000)  CALL DUMP
      XX=       FNWD/6.
      KX=       NWD/6
      AX=       KX
      IF(XX.GT.AX) KX= KX+ 1
      DO  20  I = 1, NVECES
      IX = 1
      READ (UNIT) X1,X2
        IF (IBINO .GT. 1) GO TO 104
      PUNCH 7,  X1, X2, IX
      GO TO 105
  104 CONTINUE
      WRITE (MOUT,7) X1, X2, IX
        IF (MOUT2.GT.13) WRITE (MOUT2,7) X1, X2, IX
C
  105 CONTINUE
      READ (UNIT) (BUFS(IWD), IWD = 1, NWD)
      KMAX = 0
      DO 10 K=1,KX
      KK = K
      KMIN = KMAX + 1
      KMAX = KMAX + 6
        IF (IBINO .GT. 1) GO TO 106
      PUNCH 6, ((BUFS(IWD), IWD=KMIN,KMAX), IX, KK)
      GO TO 107
  106 CONTINUE
      WRITE (MOUT,6) ((BUFS(IWD),IWD=KMIN,KMAX), IX, KK)
        IF (MOUT2.GT.13) WRITE (MOUT2,6) (BUFS(IWD),IWD=KMIN,KMAX), IX,
     1    KK
C
  107 CONTINUE
   10 CONTINUE
   20 CONTINUE
      NOC = NVECES * (KX+1) + 3
        IF (IBINO .GT. 1) GO TO 120
      WRITE(6,8) NOC
      WRITE (6,7009)
```

```
      REWIND UNIT
      WRITE (6,7001) UNIT, IDENT(IBINO+1)
      RETURN
C
C
  100 CONTINUE
      MOUT=         IBINO + 10
      MOUT2=        MOUT + 1
      READ (UNIT) IDA, (ID(I), I=1,12)
      WRITE (MOUT,3) IDA
        IF (MOUT2.GT.13) WRITE (MOUT2,3) IDA
      WRITE (MOUT,4) (ID(II), II=1,12)
        IF (MOUT2.GT.13) WRITE (MOUT2,4) (ID(II),II=1,12)
      GO TO 101
C
  102 CONTINUE
      WRITE (MOUT,5) HNUT, FNWD
        IF (MOUT2.GT.13) WRITE (MOUT2,5) HNUT, FNWD
      GO TO 103
C
  120 CONTINUE
      END FILE MOUT
        IF (MOUT2.GT.13) END FILE MOUT2
        IF (IBINO .EQ. 2) REWIND UNIT
        IF (IBINO.EQ. 2) REWIND MOUT
      WRITE (6,7002) UNIT, MOUT
 7002 FORMAT (28HODIANTC, INPUT TAPE ON UNIT ,I3, 25H, COMPLETED SUCCESS
     1FULLY. / 44H A BCD DATA TAPE WAS WRITTEN ON UNIT MOUT = ,I3)
        IF (MOUT2.GT.13) WRITE (6,7003) MOUT2
 7003 FORMAT (64H A SECOND COPY OF THE BCD DATA TAPE WAS WRITTEN ON UNIT
     1 MOUT2 = ,I3)
      WRITE (6,7004) (ID(II),II=1,12)
 7004 FORMAT (14H ID RECORD IS ,5X, 12A6)
      RETURN
      END
```

```
      SUBROUTINE DIANCT(M,N)
C     *****WARNING - THIS PROGRAM ALLOWS ONLY 17 DENSITY SETS PER  *****
C              THETA SET, 25 THETA SETS PER FREQUENCY GROUP.
      DIMENSION THETAK(25), NUMBER(17), JRHO(25,17)
C
C     THE LNTHTK ARRAY STORES LN THETAK
      REAL LNTHTK(25)
C
      DATA TEST/1.E-3/, LN/0/, KOUNT/1/, XX2/0./
C
C     ASSUMES ALL DELETIONS AT A GIVEN THETA ARE SPECIFIED IN ORDER OF
C       DECREASING RHO.  THAT IS, THE FIRST RHO SET TO BE DELETED AT
C       A GIVEN THETA MUST BE THAT FOR THE HIGHEST RHO.
C
C
C     DESCRIPTION OF INPUT CARDS CONTROLLING DELETIONS OF THETA-RHO
C     POINTS
C
C     IF BLANK INPUT CARD IS USED, NO DELETIONS, DO NORMAL DIANCT RUN.
C     OTHERWISE READ DELETION CARDS UNTIL A BLANK CARD IS READ.
C
C     READ ONE INPUT CARD PER MODIFIED THETA SET .
C
C     COLUMNS  FORMAT  VARIABLE NAME  MEANING
C
C     1-10     E10.6   THETAK(IC)     TEMPERATURE AT WHICH DATA IS TO BE
C                                       DELETED
C     13-14    I2      NM             NUMBER OF DENSITY SETS TO BE
C                                       DELETED
```

```
C                                            IF (THETAK(IC).EQ.-THETAK(IC)),
C                                              DELETE ENTIRE THETA-RHO SET
C                                              (NUMBER OF RHO SETS TO BE
C                                              DELETED MUST BE SPECIFIED)
C                                            IF (THETAK(IC).EQ.0., IC.EQ.1),
C                                              DO NOT DELETE ANY POINTS
C                                            IF (THETAK(IC).EQ.0., IC.GT.1),
C                                              DO NOT DELETE ANY MORE POINTS
C      17-16,    22(I2,   JRHO(IC,J)      1ST,2ND,...,JTH,...,NM-TH NUMBERED
C      20-21,       1X)                      RHO(IC) SETS TO BE DELETED
C       ...,                                 (IF ENTIRE THETA SET IS TO BE
C      62-63                                 DELETED, THESE NEED NOT BE
C                                            SPECIFIED)
      DIMENSION IDENT(2)
      DATA IDENT/6HBINARY,5H BCD /
      INTEGER UNIT
      UNIT = M
      IBINO = N
      MIN=          5
        IF (IBINO .LE. 1) GO TO 400
      MIN=          IBINO + 10
      IBINO=        0
      N=            0
  400 CONTINUE
    4 FORMAT  (12A6)
    5 FORMAT  (6E12.7)
    6 FORMAT (I12)
 7000 FORMAT (I12,12A6)
 7001 FORMAT (1H0,26X,19HDIANCT, RUN ON UNIT,I3,6H WITH ,A6,45H TAPE IDE
     1NTIFICATION, COMPLETED SUCCESSFULLY./1H1)
 7002 FORMAT (28H NWO.GT.1000 .OR. NNO.GE.0. )
C
      WRITE (6,7004)
 7004 FORMAT (43H1BEGIN DIANCT.  THE FOLLOWING DATA IS INPUT ,///)
C
C     READ INPUT CARDS CONTROLLING DELETIONS OF THETA-RHO POINTS.
      DO 700 IC=1,25
      READ (5,7003) THETAK(IC), NM, (JRHO(IC,J), J=1,NM)
 7003 FORMAT (E10.6, 2X, I2, 2X, 17(I2,1X) )
      NUMBER(IC)=  NM
        IF (THETAK(IC)) 51,701,52
   51 CONTINUE
      XX2=          XX2 + 1.
      LN=           LN + 2
   52 CONTINUE
      LN=           LN + 3 * NUMBER(IC)
      LNTHTK(IC)=  ALOG(ABS(THETAK(IC)))
C
      WRITE (6,7005) IC, THETAK(IC), LNTHTK(IC), NM, (JRHO(IC,J),
     1               J=1,NM)
 7005 FORMAT (10H0THETA SET ,I2 /10H THETAK = ,E12.6, 11H, LNTHTK = ,
     1        E12.6, 23H, DELETE THE FOLLOWING ,I2, 14H RHO SET(S) - ,
     2        10(I2,2X) / (84X, 10(I2,2X)) )
C
  700 CONTINUE
```

```
      IC=           25
  701 CONTINUE
C
C     IC1 COUNTS THE NUMBER OF TEMPERATURES FOR WHICH DENSITY SETS ARE
C       TO BE REMOVED.
      IC1=          IC - 1
C
      READ (MIN,6) IDA
      READ (MIN,4) (ID(I), I=1,12)
         IF (IBINO .EQ. 1) WRITE (UNIT,7000) IDA, (ID(I), I=1,12)
         IF (IBINO .EQ. 0) WRITE (UNIT) IDA, (ID(I), I=1,12)
      READ (MIN,5) HNUT, FNWD
      NWD=          IFIX(FNWD + .5)
        IF (MIN .EQ. 5) GO TO 403
      XX=           FNWD/6.
      KX=           NWD/6
      AX=           KX
        IF (XX .GT. AX) KX= KX+1
  403 CONTINUE
C     LN IS THE TOTAL NUMBER OF CELLS IN THE BUFS ARRAY THAT ARE TO BE
C       REMOVED.
      NEWNWD=       NWD - LN
      FFNWD=        FLOAT(NEWNWD)
      WRITE (UNIT)  HNUT, FFNWD
      WRITE (6,7006) LN, NEWNWD
 7006 FORMAT (55HOLN IS THE TOTAL NUMBER OF POINTS TO BE REMOVED.  LN =
     1, I4,25H.  NEWNWD = NWD - LN = , I4)
      NVECES = HNUT + 1.
      IF (NWD.GT.1000) GO TO 40
      DO  200 I = 1, NVECES
      READ (MIN,5) X1,X2
      X2=           X2 - XX2
      WRITE (6,7012) XX2,X2
 7012 FORMAT (118H1XX2 IS THE TOTAL NUMBER OF TEMPERATURE SETS TO BE REM
     1OVED.  X2 IS THE NUMBER OF TEMPERATURE SETS PER FREQUENCY GROUP. /
     27H XX2 = ,F12.3, 10X, 6H X2 = ,F12.3)
      WRITE (UNIT) X1,X2
        IF (MIN .NE. 5) GO TO 401
      READ (MIN,5) (BUFS(IWD),IWD=1,NWD)
      GO TO 402
  401 CONTINUE
      KMAX=         0
      DO 404 K=1,KX
      KMIN=         KMAX + 1
      KMAX=         KMAX + 6
      READ (MIN,409) ((BUFS(IWD),IWD=KMIN,KMAX), IX, KK)
  409 FORMAT (6E12.7, 1X, I3, I4)
  404 CONTINUE
  402 CONTINUE
C
      I1=           1
      I2=           1
      NOWNWD=       NWD
        IF (LN .EQ. 0) GO TO 450
C
```

```
  710 CONTINUE
C     FIND THETAK(I1), I1=1,IC1
C
      WRITE (6,7014) LNTHTK(I1), BUFS(I2), I2
 7014 FORMAT (32H   DIANCT IS COMPARING LNTHTK = ,E12.6,  18H  WITH BUFS
     1(I2) = , E12.6, 8H,  I2 = ,I4)
        IF (ABS( (LNTHTK(I1)-BUFS(I2))/BUFS(I2)) .LT. TEST) GO TO 720
      I2LAST=        I2
      I2=            I2 + (IFIX(BUFS(I2+1)+.5)) * 3 + 2
C
C     CHECK THE VALUE OF I2.  THE FOLLOWING IF TEST SHOULD BE PASSED
C       ONLY IF THETA(I1) IS INPUT INCORRECTLY, OR IF THE BUFS ARRAY
C       CARDS ARE OUT OF ORDER.
        IF (I2.GT.(NWD-1) .OR. I2.LT.(I2LAST + 5)) GO TO 999
      GO TO 710
C
  720 CONTINUE
C     THETAK(I1) HAS BEEN LOCATED AS BUFS(I2)
      WRITE (6,7011) THETAK(I1), I2
 7011 FORMAT (14H0THETAK(I1) = ,E12.6,39H HAS BEEN LOCATED AS BUFS(I2),
     1   I2 =  ,I4)
        IF (THETAK(I1) .GT. 0.) GO TO 761
      ISKIP=         IFIX(BUFS(I2+1) + .5) * 3 + 2
      I3=            I2
      GO TO 751
C
  761 CONTINUE
C     THETAK .GT. 0., DELETE RHO SET(S), ONE AT A TIME
C
        IF (NUMBER(I1) .GT. IFIX(BUFS(I2+1) + .5))  GO TO 999
      ISKIP=         3
      BUFS(I2+1)=  FLOAT(IFIX(BUFS(I2+1)+.5) - NUMBER(I1))
      WRITE (6,7013) THETAK(I1), BUFS(I2 + I)
 7013 FORMAT (14H FOR THETAK = , E12.6, 32H, BUFS(I2+I) WAS MODIFIED TO
     1BE , E12.6)
C
  750 CONTINUE
      I3=            I2 + 2 + 3*(JRHO(I1,KOUNT)  - KOUNT)
  751 CONTINUE
C
C
      NOWNWD=        NOWNWD - ISKIP
      DO 752 I4=I3,NOWNWD
      BUFS(I4)=    BUFS(I4 + ISKIP)
  752 CONTINUE
C
        IF (THETAK(I1) .LT. 0.) GO TO 709
      KOUNT=         KOUNT + I
        IF (KOUNT .GT. NUMBER(I1)) GO TO 709
      GO TO 750
  709 CONTINUE
      I1=            I1 + 1
      I2=            I
      KOUNT=         1
  450 CONTINUE
```

```
        IF (I1 .LT. IC) GO TO 710
      WRITE (UNIT) (BUFS(IWD), IWD=1,NOWNWD)
      LRNI=        I
      WRITE (6,7008) LRNI, NOWNWD
 7008 FORMAT (7/H0LRNI COUNTS THE NUMBER OF FREQUENCY GROUPS THAT HAVE B
     1EEN WRITTEN.   LRNI = , I4, 15H, AND NOWNWD = , I5)
  200 CONTINUE
      END FILE UNIT
      REWIND UNIT
        IF (MIN .NE. 5) WRITE (6,410) MIN
  410 FORMAT (40H0DIANCT, RUN USING BCD INPUT TAPE MIN = ,I3, 12H, COMPL
     1ETED.  )
      WRITE (6,7001) UNIT, IDENT(IBINU+1)
      RETURN
   40 WRITE (6,7002)
      REWIND UNIT
      RETURN
  999 CONTINUE
C     E R R O R   E X I T
C
      WRITE (6,7007)
 7007 FORMAT (85H1I2 TOO LARGE, OR LESS THAN (I2LAST+5), OR THETAK(I1).E
     1Q.0., OR NUMBER(I1) TOO LARGE.    )
      CALL MERR
      RETURN
      END
```

DIANE TAPE AND DIANE CARD FORMAT

The DIANE cards, together with the DIANTC (tape to cards), DIANCT (card to tape), and DYPDIN (refer to later writeup) programs form an effective mechanism for transfer of opacity data from one user to another or from one computer to another. Data have been transferred this way between the IBM-7044, the UNIVAC-1108, and the CDC 3600, 6400, 6600 computers. This is possible because the cards are in decimal format and the programs are all in compatible FORTRAN IV.

The DIANE cards punched by the DIANTC (tape to cards) program have the following format:

CARD PUNCHED	FORMAT	COLUMNS USED	NAME IN PROGRAM	DESCRIPTION
1	I12	1 - 12	IDA	12-digit identification number
2	12A6	1 - 72	ID	Heading from identification (header) card
3	E12.7	1 - 12	HNUT	Number of frequency groups
3	E12.7	13 - 24	FNWD	Number of words/frequency grouping
4	E12.7	1 - 12	X1	If X1 < 0, indicates that the grey absorption coefficients follow If X1 > 0, then X1 is the value of the lower end of a frequency band
4	E12.7	13 - 24	X2	Number of temperatures
5	E12.7	1 - 12	BUFS(IWD), IWD=1	$\ln \theta_1$
5	E12.7	13 - 24	BUFS(IWD), IWD=2	Number of τ's at θ_1 (τ is the specific volume in cc/gm)
5	6E12.7	1st card: 25 - 72	BUFS(IWD), IWD=3, LAST LAST=(3*BUFS(2))+2	$\ln K_R$, $\ln K_P$, $\ln \tau$, $\ln K_R$, $\ln K_P$, . . .
		succeeding cards: 1 - 72		$\ln \theta_2$, No. of τ's at θ_2, $\ln K_R$, $\ln K_P$, $\ln \tau$, . . .

```
      SUBROUTINE DIANE(M,N)
C     D I A N E   F O R T R A N
C
C     MODIFIED BY BILL LINDLEY ON FEB. 27, 1967, TO ACCEPT DATA FROM
C       CASE (ANDIMX TAPES) AND DIAPHANOUS OPACITY DATA.  (CODE WAS
C       CALLED ANDY FROM FEB. 27,1967 UNTIL JUNE 12, 1967.)
C
C     MODIFIED BY C. IMES TO COMBINE DIANE WITH SCATTERING AND DIANE WITHOUT
C        SCATTERING ON JANUARY 30, 1967
C
C*    ALL DIANE RUNS USING CONDENSED DIAPHANOUS TAPES (DENSER TAPES)
C*    MUST READ THESE TAPES IN EVEN PARITY -
C*    THIS IS DONE BY SPECIFYING THE K AND E OPTIONS ON THE TAPE ASSIGN CARD
C
      REAL LOWLIM
      INTEGER SCAT
      INTEGER HOBID
      INTEGER DENSER
      DIMENSION A(20), IZ(10), COMP(10)
      DIMENSION NOSCAT(3)
      DATA NOSCAT / 6H WITH , 6H  NO  , 6H.397/  /
      DATA DENSER / 6HDENSER /
      DATA  HOBID/6HANDIMX/
      DATA DIMRHO/15.0/, IDMRHO/17/, IDMU2/500/, DIMCMU/2000./,
     1     IDMBUF/1000/, IDMTH/25/
C
      COMMON/WBL/AMU(150), U1(150), U2(500), BMU(500), TMU(500),
     1           CMU(2000), UX(300)
C
      DIMENSION AK(15,25,17), RO(25,17), AKT(15), ID(13)
     1,KAMAX(25), PK(15,25,17), THETA(25), BUFS(1000), ANUK(5)
     2,AKLW(5), AKUP(5), TP(5), BKLW(5), BKUP(5), PCHA(20), BHNU(152)
     3,PKT(15), SKP(25,17), SKR(25,17), JDID(25,12)
      DIMENSION  HUBMU(3000)
      EQUIVALENCE (HUBMU, AMU)
      EQUIVALENCE(IUX,UX)
      EQUIVALENCE (A(1),ZBAR), (A(2),RHO), (A(3),BIGP), (A(4),EPSMAL),
     1            (A(5),AKAPPA), (A(6),WAMBDA), (A(7),EIPART),
     2            (A(8),GAMNEW)
C
C     NOTE ID(13) IS USED AS KAMAX(0)
C
      SCAT = M
      LOWLIM=      .2
      IBCOD = N
      IF (SCAT .EQ. 2) LOWLIM = .3977
         IF (SCAT .EQ. 1) LOWLIM= 1.E-10
C
C     TO RUN DIANE, THESE DATA CARDS ARE REQUIRED:
C     (ALL INPUT TEMPERATURES AND FREQUENCIES ARE IN UNITS OF ELECTRON
C     VOLTS)
C
C     THE FIRST DATA CARD REQUIRED HAS AN IDENTIFICATION NUMBER IN COLUMNS
C     1-12 (FORMAT (I12)).  THIS IS AN OPTIONAL NUMBER, BUT IT IS HELPFUL
```

```
C     TO USE IT AS A SEQUENCING NUMBER, INCREASING ITS VALUE BY ONE EACH TIME
C     A RUN IS MADE.
C
C     THE SECOND DATA CARD REQUIRED HAS A HEADER IN (12A6) FORMAT WITH ANY
C     TITLE INFORMATION DESIRED FOR THE RUN.  SUGGESTED DATA INCLUDE MATERIAL,
C     RUN TYPE, DIAPHANOUS TAPES USED, DATE, TEMPERATURE RANGE, NUMBER OF
C     FREQUENCY SETS, DOER/REQUESTER, ETC.
C
C     THE THIRD DATA CARD REQUIRED CONTAINS THE FOLLOWING INFORMATION:
C
C     COLUMNS    VARIABLE NAME   FORMAT   DATA
C
C     1-10       HNUT            F10.4    NUMBER OF FREQUENCY GROUPS
C     11-20      TP(1)           F10.4    TP(1).EQ.2. - DESIGNATES SCRATCH TAPE 2
C     21-30      TP(2)           F10.4    TP(2).EQ.3. - DESIGNATES SCRATCH TAPE 3
C     31-40      TP(3)           F10.4    TP(3).EQ.4. - DESIGNATES SCRATCH TAPE 4
C     41-50      TP(4)           F10.4    TP(4).EQ.7. - DESIGNATES SCRATCH TAPE 7
C     51-60      TP(5)           F10.4    TP(5).EQ.8. - DESIGNATES SCRATCH TAPE 8
C
C     THE FOURTH, ETC., DATA CARD(S) REQUIRED CONTAIN THE FREQUENCY INPUT VALUES
C     THEY MUST BE SPECIFIED IN DESCENDING ORDER, FORMAT (7F10.4).
C     EACH FREQUENCY GIVEN IS AT THE LOWER END OF ITS GROUP, AND THE LAST
C     FREQUENCY IN THE INPUT MUST BE .001 OR SOME OTHER SMALL BUT FINITE NUMBER.
C
C     FOLLOWING THE FREQUENCY INPUT CARDS IS A DATA CARD (NEXT-TO-LAST DATA
C     CARD IF ONLY DIAPHANOUS (AND/OR ANDIMX) OR SILVIA OR ZSAZSU DATA
C     ARE USED.  THIRD-FROM-LAST CARD, OTHERWISE) CONTAINING THE
C     FOLLOWING INFORMATION:
C
C     COLUMNS    VARIABLE NAME   FORMAT   DATA
C
C     1-10       THN             F10.4    THN.EQ.0.IS THE NORMAL CASE: SIGNALS
C                                          THAT DATA IS TO BE READ FROM DIAPHA-
C                                          NOUS AND/OR ANDIMX DATA
C                                         THN.LT.0. SIGNALS THAT SPECIAL LOW
C                                          TEMPERATURE DATA WILL BE READ FROM
C                                          TAPE H, A DATA TAPE MADE BY ZSAZSU,
C                                          SILVIA, OR ALUETO
C                                         THN.GT.0. SIGNALS THAT CARD INPUT
C                                          FOR LOW TEMPERATURE POINTS WILL BE
C                                          READ (TO DATE, CH2 IS THE ONLY
C                                          MATERIAL THAT HAS BEEN TREATED
C                                          THIS WAY)
C
C     11-20      THSKIP          F10.4    THSKIP.EQ.0 IS THE NORMAL CASE:
C                                          IF(THN.EQ.0.), THSKIP IS NOT USED
C                                          IF(THN.NE.0..AND. THSKIP.NE.0.):
C                                          THSKIP.GT.0. MEANS SKIP THSKIP
C                                          TEMPERATURES AT LOW END
C                                          THSKIP.LT.0. MEANS PICK UP EACH
C                                          THSKIP'TH TEMPERATURE
C
C     NEXT DATA CARD REQUIRED ONLY IF SILVIA, ZSAZSU, OR ALUETO DATA
C     ARE USED
C
```

```
C      COLUMNS     VARIABLE NAME     FORMAT    DATA
C
C      1-10        ANUK(K)           F10.4     THIS IS A HIGHER FREQUENCY
C                                               THAN THE LAST ONE AVAILABLE ON
C                                               INPUT TAPE OR CARDS.  IT IS
C                                               THE FREQUENCY OF AN 'EDGE' FOR
C                                               WHICH OPACITY DATA ARE TO BE
C                                               PROVIDED AS INDICATED BELOW.
C
C      11-20       AKLW(K)           F10.4     WHEN KAPPA=A+B*RHO, THIS IS A
C                                               FOR THE LOWER KAPPA VALUE AT
C                                               THE INPUT ANUK(K).
C                                              OTHERWISE, IT IS THE LOWER
C                                               VALUE OF KAPPA AT THE INPUT
C                                               ANUK(K).
C
C      21-30       AKUP(K)           F10.4     WHEN KAPPA=A+B*RHO, THIS IS A
C                                               FOR THE UPPER KAPPA VALUE AT
C                                               THE INPUT ANUK(K).
C                                              OTHERWISE, IT IS THE UPPER
C                                               VALUE OF KAPPA AT THE INPUT
C                                               ANUK(K).
C
C      31-40       BKLW(K)           F10.4     WHEN KAPPA=A+B*RHO THIS IS B
C                                               FOR THE LOWER KAPPA VALUE AT
C                                               THE INPUT ANUK(K).
C                                              OTHERWISE, IT IS ZERO.
C
C      41-50       BKUP(K)           F10.4     WHEN KAPPA=A+B*RHO, THIS IS B
C                                               FOR THE UPPER KAPPA VALUE AT
C                                               THE INPUT ANUK(K).
C                                              OTHERWISE, IT IS ZERO.
C
C
C      LAST DATA CARD MUST CONTAIN THE FOLLOWING INFORMATION (ALL
C      COMMENTS REFERRING TO DIAPHANOUS TAPES ARE APPLICABLE TO ANDIMX
C      TAPES, AS WELL)
C
C
C      COLUMNS     VARIABLE NAME     FORMAT    DATA
C
C      1-10        TAPES             F10.4     IF (TAPES.GT.0.), INDICATES THE
C                                               NUMBER OF DIAPHANOUS (AND/OR
C                                               ANDIMX) TAPES THAT ARE TO BE
C                                               USED.
C                                              IF (TAPES.LE.0.), INDICATES
C                                               THAT NO DIAPHANOUS OR ANDIMX
C                                               TAPES WILL BE USED.
C      11-20       THMAX             F10.4     HIGHEST TEMPERATURE TO BE ACCEPTED FROM
C                                               DIAPHANOUS
C      21-30       THMIN             F10.4     LOWEST TEMPERATURE TO BE ACCEPTED FROM
C                                               DIAPHANOUS
C      31-40       THM1              F10.4     HIGHEST TEMPERATURE TO BE ACCEPTED FROM
C                                               FIRST DIAPHANOUS TAPE (ON UNIT D),
C                                               IF MORE THAN ONE SUCH TAPE IS USED,
```

```
C                                        THM1.EQ.0. OTHERWISE
C      41-50     THM2           F10.4    HIGHEST TEMPERATURE TO BE ACCEPTED FROM
C                                         SECOND DIAPHANOUS TAPE (ON UNIT E),
C                                         IF MORE THAN TWO SUCH TAPES ARE USED.
C                                         THM2.EQ.0. OTHERWISE
C      51-60     THM3           F10.4    HIGHEST TEMPERATURE TO BE ACCEPTED FROM
C                                         THIRD DIAPHANOUS TAPE (ON UNIT F),
C                                         IF MORE THAN THREE SUCH TAPES ARE USED
C                                         THM3.EQ.0. OTHERWISE
C      61-70     THM4           F10.4    HIGHEST TEMPERATURE TO BE ACCEPTED FROM
C                                         FOURTH DIAPHANOUS TAPE (ON UNIT G),
C                                         IF FIVE SUCH TAPES ARE USED,
C                                         THM4.EQ.0. OTHERWISE
C
C      ***** NOTE: TAPES MUST BE .LE. 4 IF SILVIA, ZSAZSU, ALUETO, OR ANY OTHER
C            LOW TEMPERATURE DATA IS USED.                                 *****
C
C      ***** PLEASE NOTE:                                                  *****
C      *** THE NUMBER OF SCRATCH TAPES WHICH MUST BE ASSIGNED BY DRUM ASG    ***
C          CARDS IS DETERMINED BY THIS EQUATION:
C            INT (HNUT/(DIMHNU+.001 .EQ. 15.001)) + 1
C          THREE SCRATCH TAPES MAY BE ASSIGNED FOR EVERY RUN, BUT
C          1. 1-30 FREQUENCY GROUPS REQUIRE 1 SCRATCH TAPE
C          2. 31-45 FREQUENCY GROUPS REQUIRE 2 SCRATCH TAPES
C          3. 46-60 FREQUENCY GROUPS REQUIRE 3 SCRATCH TAPES
C
C          PROGRAM NEEDS MORE SCRATCH TAPE ASSIGNMENTS IF MORE THAN 60 FREQUENCY
C          GROUPS ARE SPECIFIED.
C          TO ADD TWO MORE (MAXIMUM ALLOWED) SCRATCH AREAS, ADD ASG DRUM7 AND
C          ASG DRUM8 CARDS.
C      *****                                                               *****
C
C
C
C        F O R M A T S
 3003 FORMAT (1X,8HTAPES = ,F10.4,12H WHEN THN = ,F10.4,/120H THIS COMBI
     1NATION OF LOW TEMPERATURE INPUT (USING TAPE H) AND 5 DIAPHANOUS TA
     2PES (FIFTH ONE ON TAPE H) IS NOT POSSIBLE. )
 7000 FORMAT (1H0, 42X, 7HDIANE, , A6, 35HSCATTERING, COMPLETED SUCCESSF
     1ULLY. / 1H1)
    1 FORMAT  (39H TOO MUCH DATA FOR BUFS STORAGE.  TILT.)
    2 FORMAT (13H FOR THETA = F7.2, 8H, RHO = 1PE10.5, 28H, DIAPHANOUS D
     2ATA ABOVE U = 0PF6.1,43H ARE BEING REJECTED DUE TO LACK OF STORAGE
     2.)
    3 FORMAT  (7F10.4)                                                  00000120
 7003 FORMAT (1X,7F10.4)
    4 FORMAT  (I12)
 7004 FORMAT (1X,I12)
    5 FORMAT  (10H1HNU FROM  ,F12.4,  5H  TO , F12.4)
    6 FORMAT  (/9H THETA = ,F12.4)
    7 FORMAT  (1P8E15.8)
    9 FORMAT  (12A6)                                                    00000170
 7009 FORMAT (1X,12A6)
   10 FORMAT  (41H DIAPHANOUS TAPE SEEMS TO HAVE MORE THAN 12, 11H DENSI
     2TIES.)
```

```
   11 FORMAT  (10H DENSITIES)
   12 FORMAT  (1H1)
   13 FORMAT  (I12, 12A6)
   14 FORMAT  (15H1AVERAGE KAPPAS)
   15 FORMAT  (42H 2ND SET OF DIAPHANOUS DATA HAS MORE THAN 13, 19H ENTR
     2IES.  THETA = F7.2, 8H, RHO = 1PE10.5,20H, NO GOOD ABOVE U = 0PF6.
     31)
   16 FORMAT  (23H WARNING.  FOR THETA = F10.4, 11H AND RHO = E10.4, 8H,
     2 GROUP I2, 24H HAS A U DISCREPANCY OF 1PE9.3, 8H VERSUS 1PE9.3)
C
C     GENERALLY FOR LOW TEMPERATURES, DATA FROM CARD INPUT.  BUT FOR AIR,
C     DATA FROM ZSAZSU - FIXED TABLES IN FREQUENCY, DENSITY, TEMPERATURE
C     UP TO FIVE DIAPHANOUS TAPES (D,E,F,G,H RESPECTIVELY)
C     *** NOTE:  NUMBER OF DIAPHANOUS INPUT TAPES MUST BE .LE. 4 IF SILVIA,
C     ZSAZSU, ALUETO, OR ANY OTHER LOW TEMPERATURE DATA IS USED.        ***
C     DIANE TAPE ON C
C     INPUT TAPE FROM ZSAZSU OR SILVIA ON H
      CALL OVCKON
      CALL OVCHK(KOMT)
      IDMHNU = DIMHNU                                                   00000240
      IDMCMU = DIMCMU
C     P R O C E S S   I N P U T                                         00000250
      READ (5,4)  IDA
      WRITE (6,7004)  IDA
      READ (5,9)  (ID(I), I = 1, 12)
      WRITE (6,7009)  (ID(I), I=1,12)
      READ  (5,3)HNUT, (TP(I), I = 1, 5)                                00000260
      WRITE (6,7003) HNUT, (TP(I),I=1,5)
      NHNU=         HNUT + .5
      BHNU(1) = 1.E6
C     FREQUENCY RANGE LIMITED BY CMU STORAGE
      NP1 = NHNU + 1
      READ (5,3) (BHNU(I), I = 2, NP1)
      WRITE (6,7003)  (BHNU(I), I=2,NP1)
C
C     BHNU(1) .EQ. 1.E6 IS THE PRESENT UPPER FREQUENCY LIMIT IN DIANE
C
      IF (BHNU(NP1) .LT. .001) BHNU(NP1) = .001
      NSCT = INT(HNUT/ (DIMHNU+ .001)) + 1                              00000320
      IF (NSCT .GT. 6)  CALL DUMP
      DO  501  I = 2, NSCT
      ITP = TP(I-1)
  501 REWIND ITP
CARD INPUT FOR LOW-TEMPERATURE POINTS
      READ (5,3)  THN, THSKIP
      WRITE (6,7003)  THN,THSKIP
      IF (THN)  507, 506, 508
  506 JA = 0
      NTHETA = 0
      GO TO 20
C
C     NEGATIVE THN SIGNALS THAT DATA SHALL BE READ FROM TAPE H,
C     A DATA TAPE MADE BY ZSAZSU, SILVIA, OR ALUETO
C     DATA TAPE MATERIALS INCLUDE AIR, REFRASIL, CARBON PHENOLIC,
C     POLYATOMIC CARBON, ALUMINUM, AND IRON.
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C      POSITIVE THSKIP MEANS SKIP THSKIP TEMPERATURES AT LOW END
C      NEGATIVE THSKIP MEANS PICK UP EACH THSKIP)TH TEMPERATURE
  507 REWIND 16
      READ (16) THSN,TNHNU, HNUMIN, DHNU
      CBIM = HNUMIN
      FBIM = HNUMIN - 0.5 * DHNU
      HW = 0.5 * DHNU
      W = DHNU
      WI = 1. / DHNU
      HTP = DHNU * TNHNU + FBTM
      IF (THSKIP .GT. 0.0)  GO TO 500
      NTHETA = THSN
      GO TO 502
  500 NSK = THSKIP
      NTHETA = THSN - THSKIP
      DO  504  I = 1, NSK
      READ (16) XX, RHON
      MRP = RHON
      DO  503  J = 1, MRP
  503 READ (16)
  504 CONTINUE
  502 NTHNU = TNHNU
      NUP = 2
      ANUK(1) = HTP
      BKUP(1) = 0.
      DO  510  K = 2, NUP
      READ (5,3)  ANUK(K), AKLW(K), AKUP(K), BKLW(K), BKUP(K)
  510 WRITE (6,7)  ANUK(K), AKLW(K), AKUP(K), BKLW(K), BKUP(K)
      GO TO 509
  508 NTHETA = THN
C      B E G I N   T E M P E R A T U R E   L O O P
  509 JA = 0
      DO  580  JAQ = 1, NTHETA
      IF (THN)  1500, 1504, 1502
 1504 CALL DUMP
 1500 IF (THSKIP .GT. (-.5)) GO TO 1505
      IF (AMOD(FLOAT(JAQ), -THSKIP) .EQ. 0.0)  GO TO 1501
      READ (16) XX, RHON
      MRP = RHON
      DO  1503  J = 1, MRP
 1503 READ (16)
      GO TO 580
 1501 JA = JA + 1
      GO TO 1506
 1505 JA = JAQ
 1506 READ (16)  THETA(JA), RHON
      PTHET = THETA(JA)
      MRP = RHON
      GO TO 1508
 1502 READ (5,3)  PTHET, PRM, PNU, PA, PB, PC, PD
      WRITE (6,7)  PTHET, PRM, PNU, PA, PB, PC, PD
      IF (PRM .GT. FLOAT(IDMRHO))  CALL DUMP
      MRP = PRM
      READ (5,3)  (RO(JA,J), J = 1, MRP)
      WRITE (6,7)  (RO(JA,J), J = 1, MRP)
```

```
      IF (PNU .LT. 0.5 .OR. PNU .GT. 5.0)  CALL DUMP
      NUP = PNU
      DO  1509  K = 1, NUP
      READ (5,3)  ANUK(K), AKLW(K), AKUP(K), BKLW(K), BKUP(K)
 1509 WRITE (6,7)  ANUK(K), AKLW(K), AKUP(K), BKLW(K), BKUP(K)
C     B E G I N   D E N S I T Y   L O O P
 1508 DO  575  KA = 1, MRP
      IF (IHN) 1510, 1504, 1511
 1510 READ (16) RO(JA,KA), (UR(N), N=1,NTHNU)
      AKUP(1) = AMAX1(UR(NTHNU), 1.E-10)
      GO TO 1512
 1511 AKLPNU = PA + PB * SQRT(RO(JA,KA)) + PC * RO(JA,KA) + PD *
     2 RO(JA,KA)**2
 1512 ANUTSI = ANUK(1)
CONSTRUCT TABLE OF ABS COEFFS(CMU) FOR HIGH FREQUENCIES FROM EDGE DATA
      IX = 1
      CMU(1) = AKUP(1) + BKUP(1) * RO(JA,KA)
      DO  520  K = 2, NUP
      CKUP = AKUP(K-1) + BKUP(K-1) * RO(JA,KA)
      CKLW = AKLW(K) + BKLW(K) * RO(JA,KA)
  517 IX = IX + 1
      IF (IX - 200)  1516, 1516, 1517
 1516 DNU = 0.5
      GO TO 1518
 1517 DNU = 5.0
 1518 ANUTSI = ANUTSI + DNU
      IF (ANUTSI - ANUK(K))  516, 519, 519
  516 CMU(IX) = EXP(ALOG(CKUP) + ALOG(CKLW/ CKUP) / ALOG(ANUK(K) /
     1NUK(K-1)) * ALOG(ANUTSI/ ANUK(K-1)))
      IF (IX -  IDMCMU) 517, 521, 521
  519 IX = IX - 1
      ANUTSI = ANUTSI - DNU
  520 CONTINUE
      CKUP = AKUP(NUP) + BKUP(NUP) * RO(JA,KA)
C     KAPPA GOES AS HNU**-3 BEYOND LAST EDGE
  514 IX = IX + 1
      IF (IX - 200)  1513, 1513, 1514
 1513 DNU = 0.5
      GO TO 1515
 1514 DNU = 5.0
 1515 ANUTSI = ANUTSI + DNU
      CMU(IX) = AMAX1(CKUP * (ANUK(NUP) / ANUTST)**3,LOWLIM)
      IF (IX - IDMCMU)  514, 521, 521
  521 CALL DVCHK (KOOOFX)
       GO TO(1522,522),KOOOFX
 1522 CALL DUMP
  522 SKP(JA,KA) = 0.0
      SKR(JA,KA) = 0.0
      DO  570  I = 1, NSCT
      ITP = TP(I-1)
      IF (I - NSCT)  524, 525, 505
  505 CALL DUMP
  524 MHNU = IDMHNU
      GO TO 530
  525 MHNU = NHNU - IDMHNU * (I - 1)
```

```
C     B E G I N   F R E Q U E N C Y   L O O P
  550 DO  565  IA = 1, MHNU
      IAT = IA + IDMHNU * (I - 1)
      HNUL = BHNU(IAT+1)
      UTL = HNUL  / PTHET
      UTU = BHNU(IAT) / PTHET
      IF (BHNU(IAT+1) .GE. ANUK(1))  GO TO 554
      IF (BHNU(IAT) .LE. ANUK(1))  GO TO 544
      HNUU = ANUK(1)
      GO TO 546
  544 HNUU = BHNU(IAT)
C     SUM OVER FREQUENCIES BELOW FIRST EDGE
  546 IF (IHN)  1544, 505, 1540
C     GENERAL LOW-FREQUENCY INTEGRATION(CONSTANT KAPPA)
 1540 ULL = HNUL / PTHET
      ULU = HNUU / PTHET
      ULM = 0.5 * (ULL + ULU)
      ELM = 1.0 - EXP(-ULM)
      IF (ULL .GT. 15.)  GO TO 1542
      PLN = PLNKUT(ULL,ULU)
      ELL = EXP(-ULL)
      ELU = EXP(-ULU)
      SUMKAP = (PLN + .038497433 * (ULL**4 * ELL / (1.0 - ELL) - ULU**4
     2 * ELU / (1.0 - ELU))) / ELM / AKLHNU
      GO TO 1543
CASE OF LARGE U.  ULL HERE IS UTL, SO NORMALIZATION IS SIMPLER.
 1542 ELU = EXP(-ULU)
      PLN = .153989733 * (((ULL + 3.) * ULL + 6.) * ULL + 6. - ELU *
     2 (((ULU + 3.) * ULU + 6.) * ULU + 6.))
      SUMKAP = (PLN + .038497433 * (ULL**4 - ULU**4 * ELU)) / ELM /
     2 AKLHNU
 1543 SUMPKA = AKLHNU * ELM * PLN
      GO TO 551
C     LOW-FREQUENCY INTEGRATION FOR MATERIALS WHOSE KAPPAS COME FROM A DATA TAPE
 1544 IL = MAX1(WI * (HNUL - FBTM) + 1.0, 1.0)
      IU = MAX1(WI * (HNUU - FBTM) + 1.0, 1.0)
      SUMKAP = 0.0
      SUMPKA = 0.0
      DO  550  L = IL, IU
C     ZERO INPUT OPACITIES NOW POSSIBLE
      UR(L) = AMAX1(UR(L), 1.E-20)
      HNULL = AMAX1(HNUL, FLOAT(L-1) * W+ FBTM)
      HNULU = AMIN1(HNUU, FLOAT(L) * W+ FBTM)
      ULL = HNULL / PTHET
      ULLP = HNULU / PTHET
      ULM = 0.5 * (ULL + ULLP)
      ELM = 1.0 - EXP(-ULM)
      IF (UTL .LE. 15.)  GO TO 548
CASE OF LARGE U FOR DATA TAPE MATERIALS
      ELLP = EXP(-ULLP + UTL)
      ELL = EXP(-ULL + UTL)
      PLN = .153989733 * ((((ULL + 3.) * ULL + 6.) * ULL + 6.) * ELL -
     2 ELLP * (((ULLP + 3.) * ULLP + 6.) * ULLP + 6.))
      SUMKAP = SUMKAP + (PLN + .038497433 * (ULL**4 * ELL - ULLP**4 *
     2 ELLP)) / ELM / UR(L)
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```
      GO TO 549
  548 ELL = EXP(-ULL)                                                   00001270
      ELLP = EXP(-ULLP)                                                 00001280
      PLN = PLNKUT(ULL, ULLP)
      SUMKAP = SUMKAP + (PLN + .038497433 * (ULL**4 * ELL / (1.0 - ELL)
     2 - ULLP**4 * ELLP / (1.0 - ELLP))) / ELM / UR(L)
  549 SUMPKA = UR(L) * ELM * PLN + SUMPKA
      CALL OVCHK (KOOOFX)                                               00001320
       GO TO( 547,550),KOOOFX
  547 CALL DUMP
  550 CONTINUE
  551 IF (BHNU(IAT) .LE. ANUK(1))  GO TO 560
      HNUL = ANUK(I)
      GO TO 555
  554 SUMKAP = 0.0                                                      00001410
      SUMPKA = 0.0
  555 HNUU = BHNU(IAT)
C     SUM OVER FREQUENCIES ABOVE FIRST EDGE
      IF (HNUL - ANUK(1) .GT. 100.)  GO TO 557
      IL = 2.0* (HNUL - ANUK(1)) + 1.0
      GO TO 558
  557 IL = 201. + 0.2 * (HNUL - ANUK(1) - 100.)
      GO TO 559
  558 IF (HNUU - ANUK(1) .GT. 100.)  GO TO 559
      IU = 2.0* (HNUU - ANUK(1))
      GO TO 1548
  559 IU = 200. + 0.2 * (HNUU - ANUK(1) - 100.)
      IF (IU .LT. IDMCMU)  GO TO 1548
      IF (IL .LT. IDMCMU)  GO TO 1545
      AKI(IA) = LOWLIM
      PKI(IA) = LOWLIM
      GO TO 567
 1545 IU = IDMCMU
      UTUP = ((FLOAT(IDMCMU) - 200.) * 5.0 + 100. + ANUK(1)) / PTHET
      IF (UTUP .LT. 1000.)  WRITE (6,16)  PTHET, RO(JA,KA), IAT,UTU,UTUP
 1548 DO  561  IX = IL, IU
      IF (IX .GT. 200)  GO TO 1552
      UNU = 0.5
      HDNU = 0.25
      GO TO 1553
 1552 UNU = 5.0
      HDNU = 2.5
 1553 IF (IX .GT. IL)  GO TO 1554
      HNULL = HNUL
      GO TO 1560
 1554 HNULL = HNULL + DNU
 1560 ULL = HNULL / PTHET                                               00001560
      ULLP = (HNULL + DNU) / PTHET
      ELM = 1. - EXP((-HNULL - HDNU) / PTHET)
      IF (UTL .LE. 15.0)  GO TO 1555
      ELLP = EXP(-ULLP + UTL)
      ELL = EXP(-ULL + UTL)
      PLN = .153989733 * ((((ULL + 3.) * ULL + 6.) * ULL + 6.) * ELL -
     2 ELLP * (((ULLP + 3.) * ULLP + 6.) * ULLP + 6.))
      SUMKAP = SUMKAP + (PLN + .038497433 * (ULL**4 * ELL - ULLP**4 *
```

```
     2 ELLP)) / ELM / CMU(IX)
      GO TO 1556
 1555 ELL = EXP(-ULL)
      ELLP = EXP(-ULLP)
      PLN = PLNKUT(ULL,ULLP)
      SUMKAP = SUMKAP + (PLN                     + .038497433 * (ULL**4 *
     1 ELL / (1.0- ELL) - ULLP**4 * ELLP / (1.0- ELLP))) / CMU(IX) / ELM
 1556 SUMPKA = SUMPKA + PLN * CMU(IX) * ELM
      CALL OVCHK (KOUOFX)
       GO TO(1561,561),KOUOFX
 1561 CALL DUMP
  561 CONTINUE
C     CALCULATE NORMALIZING FACTOR, FORM AVERAGE ABS COEFF, AND DO BOOKKEEPING
  560 IF (UTL - 15.0)  1558, 1558, 1557
 1557 ETU = EXP(-UTU + UTL)
      FR = EXP(-UTL)
      PLN = .153989733 * (((UTL + 3.) * UTL + 6.) * UTL + 6.  - ETU *
     2 (((UTU + 3.) * UTU + 6.) * UTU + 6.))
      DENOM = PLN + .038497433 * (UTL**4 - UTU**4 * ETU)
      GO TO 1559
 1558 ETL = EXP(-UTL)
      ETU = EXP(-UTU)
      FR = 1.
      PLN = PLNKUT(UTL, UTU)
      IF (PLN)  562, 562, 563
  563 DENOM = PLN                     + .038497433 * (UTL**4 * ETL / (1.0 -
     1 ETL) - UTU**4 * ETU / (1.0- ETU))
 1559 IF (SUMKAP)  562, 562, 566
  562 CALL DUMP
  566 AKT(IA)        = DENOM / SUMKAP
      PKT(IA) = SUMPKA / PLN
  567 CALL OVCHK (KOUOFX)
       GO TO(1565,564),KOUOFX
 1565 CALL DUMP
  564 PKT(IA) = ALOG(PKT(IA))
      SKP(JA,KA) = SKP(JA,KA) + SUMPKA * FR
      SKR(JA,KA) = SKR(JA,KA) + SUMKAP * FR
  565 AKT(IA) = ALOG(AKT(IA))
      IF (I - 1)  568, 568, 571
  568 DO  569  IA = 1, MHNU
      AK(IA,JA,KA) = AKT(IA)
  569 PK(IA,JA,KA) = PKT(IA)
      GO TO 570
  571 WRITE (ITP)  (AKT(IA), PKT(IA), IA = 1, MHNU)
  570 CONTINUE
      SKR(JA,KA) = -ALOG(SKR(JA,KA))
      SKP(JA,KA) = ALOG(SKP(JA,KA))
  575 RO(JA,KA) = -ALOG(RO(JA,KA))
      THETA(JA) = ALOG(PTHET)
      KAMAX(JA) = MRP
  580 CONTINUE
      IF (THN .LT. 0.0 .AND. THSKIP .LT. 0.0)  NTHETA = JA
      JA = NTHETA
      KA = KAMAX(JA)
C
```

```
C     D I A P H A N O U S   S E C T I O N
   20 CONTINUE
      READ (5,3) TAPES, THMAX, THMIN, THM1, THM2, THM3, THM4
      WRITE (6,7003) TAPES, THMAX, THMIN, THM1, THM2, THM3, THM4
         IF (TAPES .LT. .001) GO TO 160
         IF (THMAX .LT. .001) THMAX = 1.E5
         IF (THM1 .LT. .001) THM1 = 1.E5
         IF (THM2 .LT. .001) THM2 = 1.E5
         IF (THM3 .LT. .001) THM3 = 1.E5
         IF (THM4 .LT. .001) THM4 = 1.E5
C     ***** NOTE: TAPES MUST BE .LE. 4 IF SILVIA, ZSAZSU, ALUETO, OR ANY OTHER
C           LOW TEMPERATURE DATA IS USED.                                *****
         IF (THN.LT.0. .AND. TAPES.GT.4.5) GO TO 3002
      MEDIA = 12
      TESTT = 0.0                                                       00001920
      TAPEN = 1.0                                                       00001930
      KA = 0                                                            00001940
      MID = 1
      GO TO 22
 3002 CONTINUE
      WRITE (6,3003) TAPES, THN
  999 CALL DUMP                                                         00001970
C
   22 CONTINUE
      IF (IBCDD .EQ. 0) GO TO 350
      READ (MEDIA) UX
      IF (IUX .EQ. HOBID) GO TO 300
      IIUX=UX-.5
      IF(IIUX .EQ. (-1)) GO TO 30
      WRITE(6,7999) UX, IIUX, IUX, IUX
 7999 FORMAT (26H PROBLEM WITH FIRST RECORD /5X,1PE15.8,2X,I4,2X,A6, 2X0
     1I2)
      CALL MERR
C
  350 CONTINUE
      LHOB=1
      READ (MEDIA,7350) IUX, (ID(I),I=1,12), NZ, (COMP(I),IZ(I),I=1,NZ)
 7350 FORMAT (13A6/I2, (F6.4,I2))
      IF (IUX .NE. DENSER) CALL MERR
      WRITE (6,7351)
 7351 FORMAT (47H WE ARE PROCESSING A CONDENSED DIAPHANOUS TAPE.)
      WRITE (6,1001) IUX, (ID(I),I=1,12)
 1001 FORMAT (1H0, 13A6)
      WRITE (6,1002) NZ,(I,COMP(I),IZ(I),I=1,NZ)
 1002 FORMAT (1H0,5HNZ = ,I2,/(1H ,I2,2X,F5.4,2X,I2/))
C
  355 CONTINUE
      READ (MEDIA,7352) JJ, II, ULAST, AKLAST, TK, GAMMA, (A(K),K=1,20),
     1                  (U1(K),K=6,II), (AMU(K),K=6,II), (U2(K),K=2,JJ),
     2                  (BMU(K), K=2,JJ), (TMU(K), K=2,JJ)
 7352 FORMAT (2I4, 13E9.4, /  (14E9.4))
      IF (JJ .EQ. (-5)) GO TO 79
      IF ((II .GT. 150).OR.(JJ .GT. IUMU2)) GO TO 353
      IF (II .LT. 6) WRITE (6,8) TK, GAMMA
      IF (ULAST .GT. 0.) GO TO 351
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C      ULAST .GT. 0. IMPLIES TRANSITIONS EXHAUSTED AT ULAST . LT. (U=15.)
         IF (U2(2) .EQ. 0.) GO TO 356
  354 CONTINUE
      U2(1) = U1(I1)
      TMU(1) = AMU(I1)
      ULAST = U2(JJ)
      AKLAST = TMU(JJ)
  352 CONTINUE
      TMU(1) = AMAX1(TMU(1), LOWLIM*RHO)
      IMAX = I1
      JMAX = JJ
      JLESS = JJ-1
      NEND = 4
      GO TO 80
  356 CONTINUE
      ULAST=        U1(I1)
      AKLAST =      AMU(I1)
  351 CONTINUE
      U2(1) = 15.
      TMU(1) = AKLAST * (ULAST / 15.)**3
C     U2(2) .EQ. 0. IMPLIES THERE IS NO EDGE DATA
      IF (U2(2) .EQ. 0.) GO TO 352
      GO TO 354
  353 CONTINUE
      WRITE (6,7353) I1, JJ, IDMU2, TK, GAMMA
 7353 FORMAT (9H 150 .LT. , I3, 6H .OR. , I3, 6H .GT. , I4, 9H FOR TK =,
     1         1PE15.8, 12H AND GAMMA = , 1PE15.8)
      CALL MERR
      CALL DUMP
C     READ START OF ANDIMX TAPE
  300 MTP = MID + 4
      WRITE (6,7700) UX
 7700 FORMAT (22H WE ARE PROCESSING AN ,A6,7H TAPE. )
       READ (MEDIA) ((JDID(MX,J), J=1,12), MX=MID,MTP)
      MID = MID + 5
      READ (MEDIA)  UX
      IF (ABS(UX + 2.0) .LT. 1.E-4)  GO TO 32
      IF (ABS(UX + 7.0) .LT. 1.E-4)  GO TO 310
      CALL DUMP
C     PROCESS HUEBNER DATA SET FOR GIVEN T, RHO
  310 READ (MEDIA)  XX, XX, TK, RHO, (XX,I=1,24), UISTR, DUI,
     2 (XX,I=1,7)
      READ (MEDIA)  NMAX, (HUBMU(I), I=1,NMAX)
      LHUB = 2
      IF (NMAX .GT. 2971)  CALL DUMP
CODE ASSUMES START AT .3, DELTA U = .01
      IF (ABS(UISTR - 0.3) .GT. 1.E-4 .OR. ABS(DUI - 0.01) .GT. 1.E-5)
     2 CALL DUMP
      DO  315  I = 1, 2971
      IBK=    2972-I
  315 HUBMU(IBK+29) = HUBMU(IBK)
      DO  320  I = 1, 29
      HUBMU(I)=HUBMU(30)*(30./FLOAT(I))**3
  320 CONTINUE
      GO TO 76
```

```
   30 READ  (MEDIA) (JDID(MID,I), I=1,12)
      MID = MID + 1
      READ  (MEDIA)UX                                                   00002030
      IF (UX + 2.0) 999, 32, 999                                        00002040
C     READ IN MU VERSUS U FOR GIVEN T, GAMMA                            00002050
C     THIS IS A DIAPHANOUS DATA SET ON EITHER A DIAPHANOUS OR AN ANDIMX TAPE.
   32 READ  (MEDIA)TK,GAMMA                                             00002060
      LHOB = 1
      J = 2
CAVEAT.  THIS ASSUMES FIRST MU ALWAYS GIVEN AT .6                       00002920
      I = 6
      M6 = 1
C     READ FIRST SET OF DATA
   34 READ  (MEDIA)UX,UY                                                00002090
      IF (UX + 3.0)  35, 60, 35                                         00002110
   35 IF (UX + 4.0)  40, 50, 40                                         00002120
   40 IF (UX + 6.0)  55, 45, 55                                         00002130
   45 READ (MEDIA)  UX, UY
      IF (UX .LE. 0.0)  CALL DUMP
      ULAST = UX
      AKLAST = UY
      M6 = 2
      GO TO 34                                                          00002170
C     WHEN (-4.) FOUND, TEST IF ULAST, AKLAST ALREADY SET
   50 GO TO (51, 52), M6
   51 ULAST = U1(I-1)
      AKLAST = AMU(I-1)
   52 U2(1) = 15.
      TMU(1) =  AKLAST * (ULAST /15.)**3
      GO TO 75                                                          00002190
   55 U1(I) = UX                                                        00002200
      AMU(I) = UY                                                       00002210
      I = I + 1                                                         00002220
      GO TO 34                                                          00002230
   60 IF (I - 6)  61, 61, 64
CASE OF NO FIRST FRAME
   61 CONTINUE
      WRITE (6,8) TK, GAMMA
    8 FORMAT (50X,28H********** CAVEAT ********** /43X,56H DIANE FOUND N
     1O DATA ON THE DIAPHANOUS TAPE FOR U.LT.15 /50X,28H****************
     2************ )
      CALL DUMP
C     READ SECOND SET OF DATA
   64 U2(1) = U1(I-1)
      TMU(1) = AMU(I-1)
   65 READ  (MEDIA)UX,UY,UZ                                             00002260
      IF (UX + 4.0)  70, 74, 70                                         00002270
   70 U2(J) = UX                                                        00002280
      BMU(J) = UY                                                       00002290
      TMU(J) = UZ                                                       00002300
      J = J + 1                                                         00002310
      IF (J - IUMU2)  65, 65, 72
   72 WRITE (6,15)  IUMU2, TK, RHO, U2(J-1)
   73 READ (MEDIA)  UX, UY, UZ
      IF (UX + 4.0)  73, 74, 73
```

```
   74 ULAST = U2(J-1)                                                     00002330
      AKLAST = IMU(J-1)                                                   00002340
   75 READ  (MEDIA)ZBAR,RHO,BIGP,EPSMAL,AKAPPA,WAMBDA,EIPART,GAMNEW        00002350
      IMU(1) = AMAX1(IMU(1), LOWLIM * RHO)
      IMAX = I - 1                                                        00002360
      JMAX = J - 1                                                        00002370
      JLESS = JMAX - 1                                                    00002380
   76 READ  (MEDIA)UX                                                     00002390
      IF (ABS(UX + 2.) .LT. 1.E-4)  GO TO 78
      IF (ABS(UX + 5.) .LT. 1.E-4)  GO TO 79
      IF (ABS(UX + 7.) .LT. 1.E-4)  GO TO 77
      CALL DUMP
   77 NENU = 3
      GO TO 80
   78 NENU = 1                                                            00002420
      GO TO 80                                                            00002430
   79 NENU = 2                                                            00002440
CHECK STATUS OF TEMPERATURE-DENSITY TABLE BEING BUILT FROM DIAPHANOUS DATA
   80 IF (TK .LT. THMIN)  GO TO 133
      IF (TK .GT. TESTT) GO TO 585
      KA = KA + 1
      IF (KA .LE. IDMRHO)  GO TO 150
      WRITE (6,10)  IDMRHO
      GO TO 133
  585 IF (NTHETA .LE. 0)  GO TO 588
C     REJECT DIAPHANOUS TEMPERATURES WHICH OVERLAP THE LOW-THETA RANGE
C     WHERE DATA ARE PROVIDED BY ZSAZSA(FOR AIR) OR CARD INPUT(FOR ALL ELSE)
      IF (TK .LT. 1.001 * THETA(NTHETA)) GO TO 133
C     REJECT HIGHER TEMPERATURES IF STORAGE FULL                          00002530
      IF (JA .LE. NTHETA)  GO TO 589
  588 KAMAX(JA) = KA                                                      00002550
C     JA.EQ.0 INITIALLY AND KAMAX(0) USES ID(13)
  589 IF (JA - IDMTH)  141, 160, 143
  141 IF (TK - THMAX)  140, 140, 160                                      00002570
  143 CALL DUMP                                                           00002580
  140 NTP = TAPEN
      GO TO (142,144,3000,3001,147), NTP
  142 THM = THM1
      GO TO 146
  144 THM = THM2
      GO TO 146
 3000 CONTINUE
      THM =      THM3
      GO TO 146
 3001 CONTINUE
      THM=      THM4
      GO TO 146
  147 THM = 1.E5
  146 IF (TK .LE. THM)  GO TO 145
      NENU = 2
      GO TO 133
  145 JA = JA + 1
      TESTT = TK                                                          00002600
      THETA(JA) = ALOG(TK)                                                00002610
      KA = 1                                                              00002620
```

```
  150 GO TO (151, 640), LMOB
C     FILL IN MU VS U FOR U = 0.--.6 -- USED LATER ONLY IF UTU .GT. .6
  151 DO  149  IX = 1, 5
  149 AMU(IX) = AMU(6) * 216.0/ FLOAT(IX)**3                             00002640
      FLINT = 0.1
      UTP = BHNU(1) / TK
        IF (ULAST.GT.14.9 .AND. JLESS.GE.1) GO TO 154
CONSTRUCT TABLE OF MU = U**-3 AS FAR AS NEEDED FOR ULAST LESS THAN 14.9
      I1 = 10.0* (ULAST - .05) + 1.0
      DO  152  IX = I1, 150
      UGM = (FLOAT(IX) - 1.0) * 0.1 + .05                                00002680
  152 AMU(IX) = AMAX1((ULAST / UGM)**3 * AKLAST, LOWLIM * RHO)
      IF (UTP - 14.9)  640, 640, 628
  628 ITL = 1
  627 IF (UTP - 100.)  621, 621, 622
  621 ITU = (UTP - 15.) * 2. + 1.
      GO TO 623
  622 ITU = MIN1(171. + (UTP - 100.) * 0.2, DIMCMU)
  623 DO  626  IX = ITL, ITU
      IF (IX - 170)  624, 624, 625
  624 UGM = (FLOAT(IX) - 1.) * 0.5 + 15.25
      GO TO 626
  625 UGM = (FLOAT(IX) - 171.) * 5. + 102.5
  626 CMU(IX) = AMAX1((ULAST / UGM)**3 * AKLAST / RHO, LOWLIM)
      GO TO 640
CONSTRUCT TABLE OF MU VS U ABOVE U = 15, USING AVAILABLE DIAPHANOUS DATA
CORRECTION FOR INDUCED EMISSION UNNECESSARY FOR LARGE U
  154 UTST = U2(1)                                                       00002700
      IX = 1                                                             00002710
      CMU(1) = TMU(1) / RHO
      DO  638  JX = 1, JLESS                                             00002730
  632 IX = IX + 1                                                        00002740
      IF (UTST - UTP)  633, 633, 640
  633 IF (IX - 170)  635, 635, 637
  635 DU = 0.5
      GO TO 631
  637 DU = 5.0
  631 UTST = UTST + DU
      IF (UTST - U2(JX+1))  634, 636, 636                                00002760
  634 CMU(IX) = EXP(ALOG(TMU(JX)) + ALOG(BMU(JX+1) / TMU(JX)) / ALOG(U2(00002770
     1JX+1)/U2(JX)) * ALOG(UTST/U2(JX))) / RHO
      IF (IX - IDMCMU)  632, 639, 639
  636 IX = IX - 1                                                        00002800
      UTST = UTST - DU
  638 CONTINUE                                                           00002820
      ITL = IX
      GO TO 627
  639 WRITE (6,2)  TK, RHO, UTST
  640 SKP(JA,KA) = 0.0
      SKR(JA,KA) = 0.0
C     BEGIN DIAPHANOUS FREQUENCY LOOP
      DO  132  I = 1, NSCT
      ITP = TP(I-1)
      IF (I - NSCT)  81, 82, 143                                         00002840
   81 MHNU = IDMHNU                                                      00002850
```

```
      GO TO 83                                                          00002860
   82 MHNU = NHNU - IDMHNU * (I - 1)                                    00002870
   83 DO  130  IA = 1, MHNU                                             00002880
      IAT = IA + IDMHNU * (I - 1)                                       00002890
      UTL = BHNU(IAT+1) / TK
      UTU = BHNU(IAT) / TK
      GO TO (88, 325), LHUB
C     PROCESS HUEBNER DATA
  325 IL = AMAX1(100. * (UTL - .005) + 1., 1.)
      IU = AMIN1(100. * (UTU - .005) + 1., 3000.)
      FLINT = 0.01
      FR = 1.
      SUMKAP = 0.0
      SUMPKA = 0.0
      UTL1 = UTL
      UTU1 = UTU
      ETL = EXP(-UTL1)
      ETU = EXP(-UTU1)
      IF (UTU .LT. 30.01)  GO TO 105
      IF (UTL .LT. 80.)  GO TO 330
      AKT(IA) = LOWLIM
      PKT(IA) = LOWLIM
      GO TO 125
C     4157.7227 IS 30**3 * 15 / PI**4
  330 SUMPKA = HUBMU(3000) / RHO * 4157.7227 * (ETL - ETU)
      TERML = ETL * (1. + UTL * (2. + UTL * (3. + UTL * (4. + UTL * (5.
     2 + UTL * (6. + UTL * (7. + UTL)))))))
      IF (UTU .LT. 80.)  GO TO 335
      TERMU = 0.0
      GO TO 340
  335 TERMU = ETU * (1. + UTU *(2. + UTU * (3.+ UTU * (4. + UTU * (5. +
     2UTU *(6. + UTU * (7. + UTU )))))))
C     5.7033233E-6 IS 15 / PI**4 / (30**3)
  340 SUMKAP = 5.7033233E-6 / HUBMU(3000) * RHO * (TERML - TERMU)
      IF (IL .GT. 3000)  GO TO 117
      GO TO 105
   88 IF (UTL - 14.9)  90, 91, 91
   90 IL = AMAX1(10.0 * (UTL - .05) + 1.0, 1.0)
      GO TO 94                                                          00002980
   91 UTL2 = UTL
      UTU2 = UTU
C     DO ROSSELAND AND PLANCK AVERAGES FOR U OVER 15
   93 SUMKAP = 0.
      SUMPKA = 0.
      IF (UTL2- U2(1))  650, 650, 652
  650 IL = 1
      GO TO 654
  652 IF (UTL2 - U2(1) - 85.)  653, 653, 655
  653 IL = 2. * (UTL2+ .5  - U2(1))
      GO TO 654
  655 IL = 171. + 0.2 * (UTL2 - U2(1) - 85.)
  654 IF (UTU2- U2(1))  656, 656, 658
  656 IU = 1
      GO TO 660
  658 IF (UTU2 - U2(1) - 85.)  657, 657, 659
```

```
  657 IU = 2. * (UTU2+ .5  - U2(1))
      GO TO 660
  659 IU = 170. + 0.2 * (UTU2   - U2(1) - 85.)
  660 IF (IU .LT. IDMCMU)  GO TO 667
      IF (IL .LT. IDMCMU)  GO TO 661
      AKI(IA) = LOWLIM
      PKI(IA) = LOWLIM
      GO TO 125
  661 IU = IDMCMU
      UTUP = (FLOAT(IDMCMU) - 170.) * 5. + 85. + U2(1)
      IF (UTUP .LT. 1000.)  WRITE (6,16)  TK, RHO, IAT, UTU, UTUP
  667 DO  675  IX = IL, IU
      IF (IX .GT. 170)  GO TO 663
      DUX = 0.5
      ADU = 0.
      IADU = 0
      GO TO 665
  663 DUX = 5.0
      ADU = 85.0
      IADU = 170
  665 IF (IX .GT. IL)  GO TO 664
      UXL = UTL2
      GO TO 666
  664 UXL = (FLOAT(IX - IADU) - 1.0) * DUX + ADU + U2(1)
  666 IF (IX - IU)  668, 670, 670
  668 UXU = (FLOAT(IX - IADU))* DUX + ADU + U2(1)
      GO TO 672
  670 UXU = UTU2
  672 EXL = EXP(-UXL + UTL2)
      EXU = EXP(-UXU + UTL2)
      PLN = .153989733 * (EXL * (((UXL + 3.) * UXL + 6.) * UXL + 6.) -
     2 EXU * (((UXU + 3.) * UXU + 6.) * UXU + 6.))
C     NOTE - .153989733=  15. / PI**4
C
      SUMPKA = SUMPKA + CMU(IX) * PLN
  675 SUMKAP = SUMKAP + (PLN + .038497433 * (UXL**4 * EXL - UXU**4 * EXU
     2)) / CMU(IX)
C     NOTE - .038497433=  15. / (4 * PI**4)
C
      IF (SUMKAP)  120, 120, 677
  677 ETL = 1.
      ETU = EXP(-UTU2 + UTL2)
      PLN2= .153989733 * (ETL * (((UTL2+ 3.) * UTL2+ 6.) * UTL2+ 6.) -
     2 ETU * (((UTU2+ 3.) * UTU2+ 6.) * UTU2+ 6.))
      DENOM2= PLN2+ .038497433 * (UTL2**4 * ETL - UTU2**4 * ETU)
      IF (UTL - 14.9)  676, 680, 680
  676 ETS = EXP(-UTL2)
      DENOM = DENOM1 + DENOM2 * ETS
      PLN = PLN1 + PLN2 * ETS
      SUMKAP = SUMKAP * ETS + SUMKP1
      SUMPKA = SUMPKA * ETS + SUMP1
      GO TO 126
  680 FR = EXP(-UTL2)
      DENOM = DENOM2
      PLN = PLN2
```

```
      GO TO 126
C     DO ROSSELAND AND PLANCK AVERAGES FOR U UNDER 15
CORRECTION FOR INDUCED EMISSION POSTPONED TO WITHIN INTEGRATION LOOP(NEAR 116)
   94 UTL1 = UTL
      FR = 1.
      IF (UTU - .1)  96, 96, 98
   96 IU = 1                                                            00003050
      UTU1 = UTU
      GO TO 104                                                         00003060
   98 IF (UTU - 15.0)  100, 100, 102
  100 IU = 10.0* (UTU - .05) + 1.0                                      00003080
      UTU1 = UTU
      GO TO 104                                                         00003090
  102 UTU1 = 15.0
      UTL2 = 15.0
      UTU2 = UTU
      IU = 150
  104 SUMKAP = 0.0                                                      00003110
      SUMPKA = 0.0
      ETL = EXP(-UTL1)
      ETU = EXP(-UTU1)
      IF (UTU .LE. 0.6)  GO TO 107
  105 DO  118  IX = IL, IU                                              00003120
      IF (IX - IL)  106, 106, 108                                       00003130
  106 UXL = UTL1                                                        00003140
      GO TO 110                                                         00003150
  108 UXL = (FLOAT(IX) - 0.5) * FLINT
  110 CONTINUE
      IF (IX .GE. IU) GO TO 114
      UXU = (FLOAT(IX) + 0.5) * FLINT
      GO TO 116                                                         00003190
  114 UXU = UTU1                                                        00003200
  116 UBAR = 0.5 * (UXL + UXU)                                          00003210
      EXL = EXP(-UXL)                                                   00003220
      EXU = EXP(-UXU)                                                   00003230
      CIE = 1. - EXP(-UBAR)
C     THE HUEBNER AND DIAPHANOUS DATA ARE STORED IN THE SAME PLACE.
C     CIE IS THE CORRECTION FOR INDUCED EMISSION
C
      AKNP = AMU(IX) / RHO * CIE
      PLN = PLNKUT(UXL, UXU)
      SUMPKA = SUMPKA + PLN * AKNP
  118 SUMKAP = SUMKAP + (PLN               + .038497433 * (UXL**4 *   00003250
     1 EXL / (1.0- EXL) - UXU**4 * EXU / (1.0- EXU))) / AKNP            00003260
      GO TO 117
C     ANALYTIC FIT FOR WHOLE BAND UNDER U=.6
  107 SUMKAP = RHO / AMU(6) * .048285     * (UTU**5 * (1. - .416666667 *
     2 UTU) - UTL**5 * (1. - .416666667 * UTL))
      SUMPKA = AMU(6) * .0182548 / RHO * (UTU - UTL)
  117 PLN = PLNKUT(UTL1, UTU1)
      IF (PLN)  120, 120, 119
  119 DENOM = PLN               + .038497433 * (UTL1**4 * ETL / (1.0-
     1 ETL) - UTU1**4 * ETU / (1.0- ETU))
  121 IF (SUMKAP)  120, 120, 122
  120 CALL DUMP                                                         00003320
```

```
  122 IF (DTD .LE. 15.0 .OR. LHUB .EQ. 2)  GO TO 126
      DENOM1 = DENOM
      SUMKP1 = SUMKAP
      SUMP1 = SUMPKA
      PLN1 = PLN
      GO TO 95
  126 AKT(IA)       = DENOM / SUMKAP
      PKT(IA) = SUMPKA / PLN
  125 CALL OVCHK (KOOOFX)
      SKP(JA,KA) = SUMPKA * FR + SKP(JA,KA)
      SKR(JA,KA) = SUMKAP * FR + SKR(JA,KA)
      GO TO (1130, 1131), KOOOFX
 1130 CALL DUMP                                                     00003390
 1131 IF (AMIN1(PKT(IA), AKT(IA)))  1130, 1130, 129
  129 PKT(IA) = ALOG(PKT(IA))
  130 AKT(IA) = ALOG(AKT(IA))
C     S T O R I N G   L O G   K A P P A                             00003410
      IF (I - 1)  131, 131, 134
  131 DO  127  IA = 1, MHNU
      PK(IA,JA,KA) = PKT(IA)
  127 AK(IA,JA,KA) = AKT(IA)
      GO TO 132
  134 WRITE (ITP)  (AKT(IA), PKT(IA), IA = 1, MHNU)
  132 CONTINUE
      IF (AMIN1(SKP(JA,KA), SKR(JA,KA)))  1320, 1320, 1321
 1320 CALL DUMP
 1321 SKP(JA,KA) = ALOG(SKP(JA,KA))
      SKR(JA,KA) = -ALOG(SKR(JA,KA))
      RO(JA,KA) = -ALOG(RHO)                                        00003460
  133 GO TO (32, 155, 310, 355), NEND
  155 IF (TAPEN - TAPES)  156, 160, 160                             00003480
  156 TAPEN = TAPEN + 1.0                                           00003490
      WRITE(6,7012) MEDIA, THM
 7012 FORMAT (55H0DIANE HAS FINISHED READING FROM THE INPUT TAPE ON UNIT
     1 , I3, 1H./50H  THE HIGHEST TEMPERATURE TAKEN FROM THIS TAPE WAS ,
     2 F12.4)
      MEDIA = MEDIA + 1                                             00003500
      GO TO 22                                                      00003530
  160 JAMAX = JA                                                    00003540
      KAMAX(JA) = KA
      WRITE (6,7012) MEDIA, THMAX
C     W R I T E   D I A N E   T A P E   A N D   E D I T   R E S U L T S 00003580
      REWIND 11
      DO  596  I = 2, NSCI
      ITP = IP(I-1)
  596 REWIND ITP
      NWD = 0                                                       00003760
      DO  166 JA = 1, JAMAX                                         00003770
  166 NWD = NWD + 3 * KAMAX(JA) + 2
      FNWD = NWD
      WRITE (11)  IDA, (ID(I), I=1,12)
      WRITE (11)  MNU1, FNWD
      WRITE (6,12)
      WRITE (6,7009)  (ID(I), I=1,12)
      WRITE (6,11)
```

```
      IWD = 1
      DO  180  JA = 1, JAMAX
      KAM = KAMAX(JA)
      PRTHET = EXP(THETA(JA))
      WRITE (6,6)  PRTHET
      DO  179  KA = 1, KAM
  179 PCHA(KA) = EXP(-RO(JA,KA))
  180 WRITE (6,7) (PCHA(KA), KA = 1, KAM)
      FJAMAX = JAMAX
      DO  175  I = 1, NSCT
      IF (I - NSCT)  161, 162, 145
  161 MHNU = IDMHNU
      GO TO 163
  162 MHNU = NHNU - IDMHNU * (I - 1)
  163 IF (I - 1)  172, 172, 164
  164 IIP = IP(I-1)
      DO  165 JA = 1, JAMAX
      KAM = KAMAX(JA)
      DO  165  KA = 1, KAM
  165 READ (IIP) (AK(IA,JA,KA), PK(IA,JA,KA), IA = 1, MHNU)
  172 DO  171  IA = 1, MHNU
      IAT = IA + IDMHNU * (I - 1)
      WRITE (11) BHNU(IAT+1), FJAMAX
      WRITE (6,5) BHNU(IAT+1), BHNU(IAT)
      IWD = 1
      DO  170  JA = 1, JAMAX
      PRTHET = EXP(THETA(JA))
      WRITE (6,6)PRTHET
      KAM = KAMAX(JA)
      BUFS(IWD) = THETA(JA)
      BUFS(IWD + 1) = KAM
      IWD = IWD + 2
      DO  167  KA = 1, KAM
      BUFS(IWD) = AK(IA,JA,KA)
      BUFS(IWD+1) = PK(IA,JA,KA)
      BUFS(IWD+2) = RO(JA,KA)
      IWD = IWD + 3
      IF (IWD .LE. IDMBUF)  GO TO 167
      WRITE (6,1)
      CALL DUMP
  167 CONTINUE
      DO  168  KA = 1, KAM
  168 PCHA(KA) = EXP(PK(IA,JA,KA))
      WRITE (6,7)(PCHA(KA), KA = 1, KAM)
      DO  169  KA = 1, KAM
  169 PCHA(KA) = EXP(AK(IA,JA,KA))
  170 WRITE (6,7)(PCHA(KA),KA = 1, KAM)
  171 WRITE (11)(BUFS(IWD), IWD = 1, NWD)
  175 CONTINUE
      IWD = 1
      SILLY = -BHNU(1)
      WRITE (11) SILLY, FJAMAX
      WRITE (6,14)
      DO  178  JA = 1, JAMAX
      PRTHET = EXP(THETA(JA))
```

```
      WRITE (6,6)PRTHET
      KAM = KAMAX(JA)
      BUFS(IWD) = THETA(JA)
      BUFS(IWD + 1) = KAM
      IWD = IWD + 2
      DO  177  KA = 1, KAM
      BUFS(IWD)= SKR(JA,KA)
      BUFS(IWD+1) = SKP(JA,KA)
      BUFS(IWD+2) = RO(JA,KA)
  177 IWD = IWD + 3
      DO  176  KA = 1, KAM
  176 PCRA(KA) = EXP(SKP(JA,KA))
      WRITE (6,7)(PCRA(KA), KA = 1, KAM)
      DO  174  KA = 1, KAM
  174 PCRA(KA) = EXP(SKR(JA,KA))
  178 WRITE (6,7)(PCRA(KA),KA = 1, KAM)
      WRITE (11)(BUFS(IWD), IWD = 1, NWD)
      END FILE 11
      REWIND 11
      WRITE (6,7000) NOSCAT(SCAT+1)
      RETURN
      END                                                               00004020
```

(continued)

CARD PUNCHED	FORMAT	COLUMNS USED	NAME IN PROGRAM	DESCRIPTION
1st card of each set	I2	75 - 76	IX	2-digit sequencing number; indicates the order number of each frequency grouping set
1st card of each set	I3	78 - 80	KK	3-digit sequencing number; indicates card number within a particular frequency grouping

1. Let there be M θ values: $\theta_1, \theta_2, \ldots, \theta_M$
2. Let there be N τ values ($N = n_1$ τ values at θ_1 + n_2 τ values at $\theta_2 + \ldots + n_M$ τ values at θ_M)
3. Then FNWD = 3N+2M
   Thus FNWD counts all the words on records of card type 5 only

The total number of groups of cards that will be punched by the DIANTC program is HNUT (the number of frequency groups) plus the group of grey absorption coefficients. This number is indicated in the routine by this arithmetic statement:

NVECES = HNUT + 1.

Each set of cards punched for a frequency group consists of X1, X2, and (BUFS (IWD), IWD = 3, LAST).

The cards are sequenced numerically in two ways: (1) by the order number of the frequency group set, and (2) within each frequency group set.

A number (IX in the program) is punched in columns 75 and 76; this is the order number of the frequency grouping. It ranges in value from 1 to NVECES, as there are NVECES groups punched.

Another number (KK in the program) is punched in columns 78 through 80, and this indicates the card number within the frequency group set. The card numbers within each particular frequency grouping range from 0 to KX,

where KX is determined this way:

$$KX = NWD/6, \quad \text{NWD is a multiple of 6}$$

or

$$KX = (NWD/6)+1; \quad \text{NWD is not a multiple of 6}$$

There is also a counter (NOC in the program) that indicates the number of cards punched by the routine; it calculates that number in this way:

$$NOC = NVECES * (KX+1) + 3$$

Before using the DIANE cards-to-tape program, remove the run card; then, the output cards punched by DIANE tape-to-cards may be read in by the cards-to-tape program.

NOTE: The run card must be removed before using the DIANE cards-to-tape program.

The DIANCT (card-to-tape) program can read the DIANE cards and recreate a binary DIANE tape. Cards 1 and 2 form the first tape record. Card 3 forms the second tape record. Card 4 forms the third tape record. The fourth tape record contains BUFS (IWD), IWD = 1, LAST. Records of type 3 and 4 are repeated until the tape is complete

GREYS: A GREY OPACITY TAPE FROM DIANE DATA

Grey opacities are defined to be those Rosseland and Planck means over the entire frequency spectrum: $0 \leq h\nu \leq \infty$. The DIANE code calculates an approximation to these (as well as to the Rosseland and Planck means over specific frequency bands as determined by input parameters) from data produced by the GA DIAPHANOUS code or the LASL ANN code. (The grey frequency band is taken to be 10^{-3} eV $\leq h\nu \leq 10^{6}$ eV.)

```
      SUBROUTINE GREYS
C
C     CODED BY LAURA R. NORRIS   JANUARY, 1967
C
C     USER MUST WRITE ON A TAPE ON LOGICAL UNIT 11
C     THIS PROGRAM WILL ADD A SET OF GREYS TO THE GREY OPACITY DIANE
C     TAPE FROM INPUT CARDS
C
      COMMON/GRETAP/ARRAY(1025),TITLE(36),ID(12)
C
C     FORMATS
C
    1 FORMAT (I12/12A6)
    2 FORMAT (6E12.7)
    3 FORMAT (3I4)
    4 FORMAT (12A6)
    5 FORMAT (I3,9X,E12.7)
    6 FORMAT (1H0,12A6)
    7 FORMAT (1H0,27H THE NUMBER OF GREY SETS IS,I3)
C
C
      L = 11
      REWIND L
C
C     KSET IS THE NUMBER OF SETS OF GREYS TO BE ADDED TO THE TAPE
C
      READ (5,3) KSET,NEWTAP
C     INITIALIZE ISGN AND READ AND WRITE A TITLE
      IF (NEWTAP.EQ.0) GO TO 10
      ISGN = -1
      READ (5,4) (TITLE(I),I=1,36)
      WRITE (L)  (TITLE(I),I=1,36)
      GO TO 100
C
C
C     SPACE TAPE TO PROPER POINT
C
   10 CONTINUE
      READ (L) (TITLE(I),I=1,36)
   20 CONTINUE
      READ (L) IDNO,(ID(I),I=1,12),ISGN
      IF (ISGN.GT.0) GO TO 60
      READ (L) HNO,XNWD
      READ (L) XMATNO,TEMPNO
      NWD = XNWD
      READ (L) (ARRAY(I),I=1,NWD)
      GO TO 20
C
   60 CONTINUE
      BACKSPACE L
  100 CONTINUE
C
C     READ DIANE INPUT CARDS
C
```

```
      DO 150 J=1,KSET
      READ (5,1) IDNO,(ID(I),I=1,12)
      READ (5,2) HNU,XNWD
      NWD = XNWD
C
C     HNU IS THE NUMBER OF FREQUENCY GROUPS ON THE ORIGINAL DIANE TAPE
C     XNWD IS THE NUMBER OF WORDS IN A FREQUENCY GROUP
C
      READ (5,2) XMATNO,TEMPNO
C
C     XMATNO IS THE SPUTTER-EIONPS MATERIAL NUMBER
C     JAMAX  IS THE NUMBER OF TEMPERATURES IN THE FREQUENCY GROUP
C
      READ (5,2) (ARRAY(I),I=1,NWD)
      WRITE (L) IDNO,(ID(I),I=1,12),ISGN
      WRITE (L) HNU,XNWD
      WRITE (L) XMATNO,TEMPNO
      WRITE (L) (ARRAY(I),I=1,NWD)
      ISGN = ISGN - 1
  150 CONTINUE
C
C     ESTABLISH A SIGNAL = POSITIVE NUMBER OF GREYS ON THE TAPE
      ISGN = -ISGN - 1
      READ (5,1) IDNO, (ID(I),I=1,12)
      WRITE (L) IDNO,(ID(I),I=1,12),ISGN
      END FILE L
      REWIND L
      WRITE (6,6) (TITLE(I),I=1,36)
      WRITE (6,7) ISGN
      RETURN
      END
```

DIANE results are available as magnetic tape files and as card decks. The FORTRAN IV GREYS program can read these card decks, select the grey opacities from each given (input) DIANE card deck, and produce a data tape (called the GREY tape) which contains only the grey opacity set for each material present.

The GREY tape has an initial heading record. Then, for each set of grey opacities, the heading record of the DIANE input card deck is written and is followed by its concomitant grey opacities. The set of grey opacities for each material is in standard DIANE tape format.

The GREYS program either writes a new tape or adds grey sets to an old tape. This feature of the program allows grey sets from later DIANE runs on new materials to be added to the GREY tape without completely rewriting the tape.

A program, EGREY, has been written in FORTRAN IV language to edit the GREY tape, and may be used as a subroutine of GREYS.

Input for GREYS

CARD NO.	INPUT VARIABLE	COLUMNS	FORMAT
1	KSET	1-4	I4
	NEWTAP	5-8	I4
2-4	TITLE Array	1-72	12A6

KSET	The number of grey sets to be added to the tape
NEWTAP	If NEWTAP $\neq$ 0, the program writes a new tape; if NEWTAP = 0, the program adds new grey sets to the previous GREY tape, and cards 2 through 4 are not read
TITLE	An array of 36 alphanumeric words that are written on the GREY tape as a header record

The DIANE tape format is specified in a separate writeup.

EGREY: AN EDITING CODE FOR THE GREY OPACITY TAPE

The program EGREY was written in FORTRAN IV language to edit the GREY tape. EGREY is an adaptation of EDIANE, a routine that edits a DIANE tape.

EGREY reads the GREY tape and edits either the entire tape or only specified grey sets, as determined by input. Also refer to the GREYS code writeup.

Input for EGREY

CARD NO.	INPUT VARIABLE	COLUMNS	FORMAT
1	NSET	1-5	I5
2	XMAT(1)	1-15	E15.8
	XMAT(2)	16-30	E15.8
subsequent cards	up to NSET	etc.	

NSET — The number of grey sets to be edited; if NSET = 0, the whole tape is to be edited

XMAT — The array of material numbers corresponding to the grey sets to be edited; this array must be in the same order as the grey sets on the tape; if NSET = 0, the XMAT array is not used. (Only the first input card is required in this case.)

REDGRE: TRANSFER OF GREY OPACITY DATA

REDGRE is a FORTRAN IV program written to obtain opacity data from the GREY tape for use in other programs (refer to GREYS writeup).

The GREY tape contains opacity data for many materials. For each material, there is a set of data containing temperatures and densities, and Rosseland and Planck opacities at these temperatures. (The Rosseland and Planck opacities are computed at the given temperature and at the specified densities.) REDGRE reads desired opacity sets for desired materials from the GREY tape as determined by input. REDGRE either

```
      SUBROUTINE EGRET
C
C     CODED BY LAURA R. NORRIS    JANUARY, 1967
C
C     USER MUST READ FROM A TAPE ON LOGICAL UNIT 10
C
C     THIS PROGRAM READS ANY NUMBER OF SETS OF GREYS ACCORDING TO THE
C     MATERIAL NUMBER
C
C     EDITS THE TAPE MADE BY GREYS IN THE FOLLOWING MANNER
C                THETA RATHER THAN LN THETA
C                RHO   RATHER THAN LN TAU
C
C
C     INPUT VARIABLES
C     NSET          IS THE NUMBER OF SETS OF GREYS TO BE READ
C     XMAT          IS AN ARRAY OF MATERIAL NUMBERS WHICH INDICATE WHICH
C                   MATERIALS ARE TO BE READ FROM THE TAPE
C
      DIMENSION KCNT(40),FKAPR(40),FKAPP(40),DENS(40)
      DIMENSION XMAT(100)
C
      COMMON/GRETAP/BUFS(1000),TITLE(36),ID(12)
C
      II = 11
      REWIND II
C
      READ (5,1020) NSET
      READ (5,1130) (XMAT(I),I=1,NSET)
      J = 1
      KSET = 1
      MLINE =5
      READ  (II)      (TITLE(I),I=1,36)
      WRITE (6,1000) (TITLE(I),I=1,36)
      IF (NSET .EQ. 0) GO TO 90
   10 CONTINUE
C
      READ  (II) IDA,(ID(I),I=1,12),ISGN
      READ (II) HNU, XNWD
      READ (II) XNO, FJAMAX
      IF (XNO.EQ.XMAT(J)) GO TO 100
      NX = XNWD
      J = J + 1
      READ (II)
      READ (II) (BUFS(I),I=1,NX)
      GO TO 10
   90 CONTINUE
C
      READ  (II) IDA,(ID(I),I=1,12),ISGN
   95 CONTINUE
      READ (II) HNU,XNWD
      READ (II) XNO,FJAMAX
  100 CONTINUE
C
```

```
      NX=XNWD
      MATERL =  XNO
      JAMAX=FJAMAX
      IF (MLINE .EQ. 0) WRITE (6,1090)
      WRITE (6,1010) IDA, (ID(I), I=1,12), MATERL,NX
      NLINE=MLINE+6
      MLINE=0
      WRITE (6,1030) JAMAX
      READ  (11) (BUFS(I),I=1,NX)
      KCNT(1)=0
      NCNT=1
C
      DO 130 JA=1,JAMAX
      THETA=EXP(BUFS(NCNT))
      KAMAX=BUFS(NCNT+1)
      IF (NLINE .LE. 50) GO TO 112
      WRITE (6,1110)
      NLINE=6
C
  112 WRITE (6,1050) THETA, KAMAX
      NLINE=NLINE+3
C
      DO 115 I=1,25
      DENS(I)=0.0
      FKAPP(I)=0.0
      FKAPR(I)=0.0
  115 CONTINUE
C
      DO 120 KA=1,KAMAX
      IKAPR=NCNT-1+3*KA
      IKAPP=IKAPR+1
      IDENS=IKAPR+2
      FKAPR(KA)=EXP(BUFS(IKAPR))
      FKAPP(KA)=EXP(BUFS(IKAPP))
      DENS(KA)=EXP(-BUFS(IDENS))
  120 CONTINUE
C
      DO 125 I=1,3
      KM8=8*I
      KL=KM8-7
      IF (KL .GT. KAMAX) GO TO 127
      KM=KAMAX
      IF (KM8 .LT. KAMAX) KM=KM8
      IF (NLINE .LE. 55) GO TO 122
      WRITE (6,1110)
      WRITE (6,1120) THETA
      NLINE=9
  122 WRITE (6,1060) (DENS(K), K=KL,KM)
      WRITE (6,1070) (FKAPP(K), K=KL,KM)
      WRITE (6,1080) (FKAPR(K), K=KL,KM)
      NLINE=NLINE+4
  125 CONTINUE
C
  127 KCNT(JA+1)=KCNT(JA)+3*KAMAX+2
      NCNT=NCNT+3*KAMAX+2
```

```
  130 CONTINUE
C
      IF (NSET .EQ. 0) GO TO 140
      IF (KSET .EQ. NSET) GO TO 150
      KSET = KSET + 1
      J = J + 1
      GO TO 10
C
  140 CONTINUE
      READ  (11) IDA,(ID(I),I=1,12),ISGN
      IF (ISGN.LT.0) GO TO 160
C
  150 CONTINUE
      WRITE  (6,1035)
      WRITE(6,1040) ISGN,NSET
      REWIND 11
      RETURN
C
  160 CONTINUE
      GO TO 95
C
 1000 FORMAT  (1H 12A6)
 1010 FORMAT          (I13,9X,12A6,9X,9HMATERL = ,I4,5X,5HNX = ,I4)
 1020 FORMAT (I5)
 1030 FORMAT (1H0
     1         29H GREY ABSORPTION COEFFICIENTS,I15,15H   TEMPERATURES  )
 1035 FORMAT (27H TAPE EDITING IS SUCCESSFUL)
 1040 FORMAT (34H THE NUMBER OF GREY SETS EDITED IS ,I5,38H THE NUMBER O
     1F GREY SETS REQUESTED IS ,I5)
 1050 FORMAT (/9H THETA = , F12.5, 20X, I5, 12H   DENSITIES/)
 1060 FORMAT (9H  DENSITY, 1P8E15.8)
 1070 FORMAT (9H KAPPA(P), 1P8E15.8)
 1080 FORMAT (9H KAPPA(R), 1P8E15.8/)
 1090 FORMAT (1H1)
 1100 FORMAT (1H1///13H HNU     FROM, F13.4, 7H     TO, F13.4,
     1                 14H     CONTINUED//)
 1110 FORMAT (1H1///42H GREY ABSORPTION COEFFICIENTS    CONTINUED//)
 1120 FORMAT (/9H THETA = ,F12.5, 12H   CONTINUED/)
 1130 FORMAT (1PE15.8)
      END
```

```
      SUBROUTINE REDGRE
C     CODED BY LAURA R. NORRIS   JANUARY, 1967
C
C     USER MUST READ FROM A TAPE ON LOGICAL UNIT 10
C     USER MUST WRITE ON A TAPE ON LOGICAL UNIT 11
C     PATH OPTION IS DESIGNATED BY LRN AND LRN IS AN INPUT VARIABLE
C     IF LRN = 0, DATA IS WRITTEN ON THE MOTET PROGRAM TAPE
C     IF LRN = 1, DATA STATEMENTS ARE PUNCHED
C     ISGN          IS THE NUMBER OF EACH SET ON THE TAPE
C     TITLE         IS THE HEADING WRITTEN ON THE TAPE
C     IDNO          IS THE IDENTIFICATION NUMBER FROM THE HEADING ON THE
C                   DIANE TAPE
C     ID            IS THE TITLE FROM THE HEADING ON THE DIANE TAPE
C     HNU           IS THE NUMBER OF FREQUENCIES ON THE DIANE TAPE
C     XNWD          IS THE NUMBER OF ELEMENTS IN THE BUFS ARRAY
C     XMATNO        IS THE EIONX-SPUTTER MATERIAL NUMBER
C     TEMPNO        IS THE NUMBER OF TEMPERATURES
C
      DIMENSION BUFS(1000),TITLE(36),ID(12),XMAT(100)
      DIMENSION THETAT(25),KAMAX(25),KC(25)
C
C     FORMATS
    2 FORMAT (I2,1P5E15.8)
    3 FORMAT (6X11HDATA JAMAX/,I5,6H/,NWD/,I5,1H/)
    4 FORMAT (6X11HDATA KAMAX/,4(I12,1H,))
    5 FORMAT (5X11,5(E12.7,1H,))
    6 FORMAT (5X11,E12.7,4(1H,,E12.7),1H/)
    7 FORMAT (6X9HDATA BUFS,I2,1H/)
    8 FORMAT (6X16HCOMMON/LRN/BUFS(,I3,1H))
    9 FORMAT (6X14HDIMENSION BUFS,I2,1H(,I2,1H))
   11 FORMAT (6X18HEQUIVALENCE (BUFS(,I3,6H),BUFS,I2,4H(1)))
   12 FORMAT (6X12HDATA THETAT/,4(E12.7,1H,))
   13 FORMAT (6X,10HDATA KCNT/,4(I12,1H,))
   14 FORMAT (6X19HCOMMON/LRNA/THETAT(,I2,8H),KAMAX(,I2,7H),KCNT(,
     1        I2,1H))
   15 FORMAT (5X,I1,5(I12,1H,))
   16 FORMAT  (5X,I1,I12,4(1H,,I12),1H/)
   18 FORMAT (I1)
   19 FORMAT (5X,I1,E12.7,1H/)
   21 FORMAT (5X,I1,E12.7,1H,,E12.7,1H/)
   22 FORMAT (5X,I1,E12.7,2(1H,,E12.7),1H/)
   23 FORMAT (5X,I1,E12.7,3(1H,,E12.7),1H/)
   24 FORMAT (5X,I1,I12,1H/)
   25 FORMAT (5X,I1,I12,1H,,I12,1H/)
   26 FORMAT (5X,I1,I12,2(1H,,I12),1H/)
   27 FORMAT (5X,I1,I12,3(1H,,I12),1H/)
C
C     PATH IS DETERMINED BY INPUT VARIABLE
C
      READ (5,18)LRN
C
      I1 = 10
      L = 11
C
```

```
C     INITIALIZE COUNTER
C
      J = 1
C
C     READ NUMBER OF MATERIALS AND MATERIAL ATOMIC NUMBERS
C
      READ (5,2) NSET,(XMAT(I),I=1,NSET)
C
C     READ FIRST PHYSICAL RECORD ON GREY TAPE
C
    1 CONTINUE
      REWIND 11
      READ(11)    (TITLE(I),I=1,36)
C
C     SEARCH FOR REQUIRED OPACITY SETS
C
   10 CONTINUE
      READ (11) IDA,( ID(I),I=1,12),ISGN
      IF (ISGN .EQ. 29) GO TO 20
      READ (11)  HNU,FNWD
      READ (11)  XNO,FJAMAX
      NX = FNWD
      IF (INT(XNO+.1) .EQ. INT(XMAT(J)+.1)) GO TO 50
      READ (11)  (BUFS(I),I=1,NX)
      GO TO 10
   20 CONTINUE
      GO TO 1
C
C     READ GRETAP AND STORE THE BUFS ARRAY IN A SMALLER ARRAY FOR MOTET
C
   50 CONTINUE
      READ (11)  (BUFS(I),I=1,NX)
      K = 1
      K1 = 1
      SUM = 0.
      JAMAX = FJAMAX
      DO 80 JA = 1,JAMAX
      BUFS(K1) = BUFS(K)
      BUFS(K1+1) = BUFS(K+1)
      KK = BUFS(K+1)
      DO 60 I = 1,KK
      I2 = 2 * (I - 1)
      I3 = I2 + I - 1
      BUFS(K1+2+I2) = BUFS(K+2+I3)
      BUFS(K1+3+I2) = BUFS(K+4+I3)
   60 CONTINUE
      SUM = SUM + KK
      K2 = KK + KK + 2
      K1 = K1 + K2
      K  = K  +KK + K2
   80 CONTINUE
C
C     ESTABLISH THETAI, KAMAX, AND KCNT ARRAYS
C
      NWD = FNWD - SUM
```

```
      FNWD = NWD
      KC(1) = 0
      NC    = 1
      DO 120 JA = 1,JAMAX
      THETAT(JA) = BUFS(NC)
      KAMAX(JA)  = BUFS(NC+1)
      K2 = 2 * KAMAX(JA) + 2
      IF (JA - JAMAX) 100,110,110
  100 KC(JA+1) = KC(JA) + K2
  110 NC = NC + K2
  120 CONTINUE
      IF (LRN .EQ. 1) GO TO 200
C
C     WRITE ON MOTET PROGRAM TAPE
C
      WRITE (L) JAMAX, NWD,XNO
      WRITE (L) (THETAT(I),I=1,JAMAX),(KAMAX(I),I=1,JAMAX),(KC(I),I=1,JA
     1MAX)
      WRITE (L) (BUFS(I),I=1,NWD)
      IF (J . NE. NSET) GO TO 150
      END FILE L
      RETURN
  150 CONTINUE
      J = J + 1
      IF ((-J) .LE. (-29)) GO TO 1
      GO TO 10
C
  200 CONTINUE
      WRITE (6,8) NWD
      WRITE (6,3) JAMAX, NWD
      WRITE (6,4) (KAMAX(I),I=1,4)
      WRITE (6,13) (KC(I),I=1,4)
      WRITE (6,12) (THETAT(I),I=1,4)
C
      N = 1
      JA = JAMAX / 5
      JMAX = (JA -1) * 5
      IF ((JMAX+5) .EQ. JAMAX) JMAX = JMAX - 5
      IF (JAMAX .LT. 10) GO TO 220
      DO 210 M = 5,JMAX,5
      MM = M + 4
      WRITE (6,5) N,(THETAT(I),I=M,MM)
      WRITE(6,15) N,(KAMAX(I),I=M,MM)
      WRITE(6,15) N,(KC(I),I=M,MM)
      N = N + 1
  210 CONTINUE
  220 CONTINUE
      JM = JMAX + 5
      WRITE (6,14) JAMAX,JAMAX,JAMAX
      NU = JAMAX - JM + 1
      GO TO(225,226,227,228,229),NU
  225 CONTINUE
      WRITE (6,19)N,(THETAT(I),I=JM,JAMAX)
      WRITE (6,24) N,(KAMAX(I),I=JM,JAMAX)
      WRITE (6,24)  N,(KC(I),I=JM,JAMAX)
```

```
      GO TO 230
  226 CONTINUE
      WRITE (6,21)N,(THETAT(I),I=JM,JAMAX)
      WRITE (6,25) N,(KAMAX(I),I=JM,JAMAX)
      WRITE (6,25)  N,(KC(I),I=JM,JAMAX)
      GO TO 230
  227 CONTINUE
      WRITE (6,22)N,(THETAT(I),I=JM,JAMAX)
      WRITE (6,26) N,(KAMAX(I),I=JM,JAMAX)
      WRITE (6,26)  N,(KC(I),I=JM,JAMAX)
      GO TO 230
  228 CONTINUE
      WRITE (6,23)N,(THETAT(I),I=JM,JAMAX)
      WRITE (6,27) N,(KAMAX(I),I=JM,JAMAX)
      WRITE (6,27)  N,(KC(I),I=JM,JAMAX)
      GO TO 230
  229 CONTINUE
      WRITE (6,6) N,(THETAT(I),I=JM,JAMAX)
      WRITE (6,16) N,(KAMAX(I),I=JM,JAMAX)
      WRITE (6,16)  N,(KC(I),I=JM,JAMAX)
C
  230 CONTINUE
      NX = NWD / 5
      N2 = NX * 5
      NY = NX / 8
      N1 = NY * 8
      LR = 1
      IL = 45
      IK = 1
      N9 = 9
      IF (N2 .NE. NWD) GO TO 235
      N2 = N2 - 5
      IF (NX .EQ.N1) NY = NY - 1
      N1 = NY * 8
C
  235 CONTINUE
      DO 260 IJ = 1,NY
      WRITE (6,7) IK
      DO 240 JJ = 1,8
      LN = LR + 4
      WRITE (6,5)  JJ,(BUFS(I),I=LR,LN)
      LR = LR + 5
  240 CONTINUE
      LN = LR + 4
      WRITE (6,6)  N9,(BUFS(I),I=LR,LN)
      LR = LR + 5
      LS = LR - 44
      WRITE (6,9) IK,IL
      WRITE (6,11)LS,IK
      IK = IK + 1
  260 CONTINUE
C
      N = 1
      N5 = N1 * 5
      ND = NWD - N5
```

```
      WRITE (6,7) IK
      IF ((NX - N1) .EQ. 1) GO TO 280
      N15 = N5 + 1
      DO 270 JJ = N15,N2,5
      J4 = JJ + 4
      WRITE (6,5)  N,(BUFS(I),I=JJ,J4)
      N = N + 1
  270 CONTINUE
  280 CONTINUE
      N3 = N2 + 1
      NK = NWU - N3 + 1
      GO TO (281,282,283,284,285),NK
  281 CONTINUE
      WRITE (6,19) N,(BUFS(I),I=N3,NWU)
      GO TO 300
  282 CONTINUE
      WRITE (6,21) N,(BUFS(I),I=N3,NWU)
      GO TO 300
  283 CONTINUE
      WRITE (6,22) N,(BUFS(I),I=N3,NWU)
      GO TO 300
  284 CONTINUE
      WRITE (6,23) N,(BUFS(I),I=N3,NWU)
      GO TO 300
  285 CONTINUE
      WRITE (6,6)  N,(BUFS(I),I=N3,NWU)
  300 CONTINUE
      IK = IK + 1
      WRITE (6,9) IK,NU
      WRITE (6,11)N5,IK
      IF ((-J) .LE. (-29)) GO TO 1
      IF (J .EQ. NSET)  RETURN
      J = J + 1
      GO TO 10
      END
```

punches the opacity data in the form of DATA statements for use in a FORTRAN IV program or writes the data on a binary tape.

All of the data in each material opacity set are read by REDGRE. However, the information punched on DATA statements or written on a tape by REDGRE contains all of the data from the opacity sets except the Planck opacities.

Input for REDGRE

CARD NO.	INPUT VARIABLE	COLUMNS	FORMAT
1	LRN	1	I1
2	NSET (1)	1-2	I2
and others	XMAT	3-18	E15.8
needed	XMAT (2) up to NSET	19-32	E15.8

LRN — If LRN = 0, sets of grey opacities, temperatures, and densities are written on a tape; if LRN = 1, similar sets are punched in the form of DATA statements for use in a FORTRAN program

XMAT — An array of material numbers corresponding to the grey sets to be obtained from the GREY tape

To use the REDGRE program, the following tapes must be mounted:

1. The GREY tape must be mounted on unit 10
2. The output tape must be mounted on unit 11 unless the user intends to punch DATA statements rather than write a tape.

TEDIUS: A GOLEM ADJUNCT

TEDIUS is a FORTRAN IV program, which converts weight fractions to number fractions. One input card is read (for each compound present) by:

```
    READ (5,201) (KATNO(N), ISTOIC (N), N = 1, 10), WTFRCT
201 FORMAT (20 (I2,IX), F10.5)
```

```
      PROGRAM TEDIUS(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
C
C
C     TEDIUS WRITTEN 7JULY1967 BY A.KNOPP
C
C     TEDIUS INPUTS COMPOUND FORMULAS AND WEIGHT FRACTIONS FOR MATERIALS
C     AND COMPUTES WEIGHT AND NUMBER FRACTIONS FOR THE ELEMENTS PRESENT.
C
C     A BLANK DATA CARD IS USED TO COMPLETE AND TERMINATE CALCULATIONS.
C
C     TEDIUS COMPUTES ONLY ONE MATERIAL PER RUN.
C
C
C     ALPHABETICAL DICTIONARY OF TERMS:
C
C     ATNO (KATNO)  THE ATOMIC NUMBER (ATNO IS USED FOR PRINTOUT)
C     ATWT:  THE ATOMIC WEIGHT
C     COEF (ISTOIC):  THE SUBSCRIPT SPECIFYING THE NUMBER OF MOLES OF AN
C       ELEMENT IN A COMPOUND  (COEF IS USED FOR PRINTOUT).
C     COEMOL IS THE NUMBER OF MOLES OF THE COMPOUND.
C     FRACTZ IS THE WEIGHT FRACTION OF AN ELEMENT.
C     FRCTN IS THE NUMBER FRACTION OF AN ELEMENT.
C     ISTOIC (COEF):  THE SUBSCRIPT SPECIFYING THE NUMBER OF MOLES OF AN
C       ELEMENT IN A COMPOUND.
C     KATNO IS THE ATOMIC NUMBER (INPUT DATA)
C     KNTR COUNTS THE NUMBER OF COMPOUNDS IN A MATERIAL.
C     NOLMNT 'COUNTS' THE NUMBER OF ELEMENTS PER COMPOUND.
C     SUMMOL IS THE SUM OF THE MOLES OF ALL ELEMENTS COMPUTED.
C     SUMOL IS THE SUM OF THE MOLES OF AN ELEMENT.
C     SUMWT IS THE SUM OF THE GRAM MOLECULAR WEIGHTS FOR ALL ELEMENTS.
C     WEIGHT IS THE GRAM MOLECULAR WEIGHT OF AN ELEMENT.
C     WTFRCT IS THE WEIGHT FRACTION OF A COMPOUND IN THE MATERIAL(INPUT)
C     WTMOL IS THE GRAM MOLECULAR WEIGHT OF A COMPOUND.
C
C
C
      DIMENSION SUMOL(100), FRACTZ(100), FRCTN(100), WEIGHT(100)
      DATA SUMOL/100*0./
      DATA SUMMOL/0./
      DATA SUMWT/0./
      COMMON /LMSB/U(1)
      DIMENSION ATWT(100)
      DATA ATWT /100*0./
      DIMENSION KATNO(10), ISTOIC(10)
      KNTR=0
C     KNTR COUNTS THE NUMBER OF DATA CARDS
C
C
  105 CONTINUE
      KNTR=KNTR+1
      READ (5,201) (KATNO(N),ISTOIC(N),N=1,10),WTFRCT
  201 FORMAT(20(I2,1X),F10.5)
C     WEIGHT FRACTIONS ARE READ FROM COLUMNS 61 THRU 70
      WRITE(6,202)
```

```
  202 FORMAT (///10(1X,4HATNO,1X,4HCOEF),6X,6HWTFRCT)
      WRITE(6,203)((KATNO(N),ISTOIC(N),N=1,10),WTFRCT)
  203 FORMAT (10(2X,I2,4X,I2),3X,F10.5/)
      IF(KATNO(1).EQ.0) GO  TO 3000
C     IF KATNO(1).EQ.0, ALL DATA CARDS ARE READ, BEGIN FINAL CALCULATION
      WTMOL=0.
C     WTMOL IS THE GRAM MOLECULAR WEIGHT OF A COMPOUND.
      DO 1000 N=1,10
      IF (KATNO(N).EQ.0) GO TO 1001
      K=1
C
C
  101 CONTINUE
      IF (IFIX(U(K)+.5).EQ.KATNO(N)) GO TO 102
      K=K+IFIX(U(K)+.5)+2
      GO TO 101
C
C
  102 ATWT(N)=U(K+1)
      WTMOL=ATWT(N)*FLOAT(ISTOIC(N))+WTMOL
      WRITE(6,302) (ATWT(N),ISTOIC(N),WTMOL)
  302 FORMAT (26H USING AN ATOMIC WEIGHT OF,F10.5,20H WITH THE SUBSCRIPT
     1 ,I2,50H, THE CURRENT MOLECULAR WEIGHT OF THIS COMPOUND IS ,F13.6)
C
C
 1000 CONTINUE
      N=11
C
C
 1001 CONTINUE
      NOLMNT=N-1
      COEMOL=WTFRCT/WTMOL
C     COEMOL IS THE NUMBER OF MOLES OF THE COMPOUND.
C
C
      WRITE (6,303)
  303 FORMAT (1H )
      DO 2000 N=1,NOLMNT
C     IZ IS THE ATOMIC NUMBER.
      IZ=KATNO(N)
C     SUMOL IS THE TOTAL MOLES FOR EACH ELEMENT.
      SUMOL(IZ)=SUMOL(IZ)+COEMOL*FLOAT(ISTOIC(N))
C     WEIGHT(IZ) CONTAINS WEIGHT FRACTIONS OF ELEMENTS
      WEIGHT(IZ)=SUMOL(IZ)*ATWT(N)
      WRITE (6,402) (IZ,SUMOL(IZ),ATWT(N),WEIGHT(IZ))
  402 FORMAT (13H FOR ELEMENT ,I2,13H,     SUMOL = ,F13.6,12H,     ATWT =
     1,F10.5,37H,     AND THE GRAM MOLECULAR WEIGHT = ,F13.6)
 2000 CONTINUE
C
C
C
      GO TO 105
 3000 CONTINUE
      KNTR=KNTR-1
C
```

```
C
      DO 3001 I=1,100
      SUMMOL=SUMOL(I)+SUMMOL
C     SUMMOL IS THE TOTAL NUMBER OF MOLES OF ALL ELEMENTS
      SUMWT=WEIGHT(I)+SUMWT
 3001 CONTINUE
C     FRCTN(J) CONTAINS NUMBER FRACTIONS OF ELEMENTS
C
C
      DO 4000 J=1,100
      IF (SUMOL(J).EQ.0.) GO TO 4040
      FRCTN(J)=SUMOL(J)/SUMMOL
      FRACTZ(J)=WEIGHT(J)/SUMWT
      WRITE (6,502) (J,FRCTN(J), FRACTZ(J))
  502 FORMAT (5H0Z = ,I3,10X,19H NUMBER FRACTION = ,F13.6,10X,19H WEIGHT
     1 FRACTION = ,F13.6)
 4040 CONTINUE
 4000 CONTINUE
      WRITE(6,602) KNTR, SUMMOL
  602 FORMAT (//45H0THE NUMBER OF COMPOUNDS IN THIS MATERIAL IS ,I3,42H
     1 AND THE TOTAL MOLES OF THIS MATERIAL IS ,F13.6)
      WRITE (6,702)
  702 FORMAT (47H0TEDIUS COMPLETED SUCCESSFULLY (AND TEDIOUSLY).)
      CALL EXIT
      CALL MARIE
       RETURN
      END
```

where KATNO (N) is the atomic number for the Nth element, ISTOIC (N) is the smallest integer subscript (for the Nth element) when the compound is written as

$$A_\alpha B_\beta C_\kappa D_\delta E_\epsilon \ldots ,$$

and WTFRCT is the number of grams of this compound. (WTFRCT can thus be the weight-percent if 100 grams are considered present.)

TEDIUS uses the MARIE subprogram (previously described) as its data source for atomic weights for all the elements. The compound molecular weight is calculated as

$$A = \sum_{N=1}^{N=M\leq 10} (M_N^o)(I_N),$$

where M_N^o is the atomic weight of the Nth element in the compound and I_N = ISTOIC(N) as defined above. The number of moles of the compound is then calculated as

$$B = WTFRCT/A$$

In addition, a cumulative summation is made of the number of moles and of the weight of each element present.

When all compound cards have been read, a blank final card signals the final computation phase. The total number of moles (of all elements) and the total weight (of all compounds present) is calculated. The total weight will ordinarily equal 100 gm if the several variables WTFRCT were the weight-percents of the compounds read in. However, this calculation allows the variables WTFRCT to sum to any number since the renormalization is then done. Finally, the number fraction and weight fraction are calculated for each element present in the total mixture.

EDSILV: A SILVIA TAPE EDIT PROGRAM

EDSILV can edit tapes written in SILVIA format. SILVIA, ZSASIL and ALOUETTE tapes are assumed to have the following SILVIA-tape format:

1. A first binary record containing:
   a. FNTH, the number of temperatures
   b. FIH, the number of absorption coefficients for each temperature-density point
   c. HNUMIN, a number specifying the middle of the first frequency band, in eV
   d. DHNV, a $\Delta h\nu$ in eV used as a frequency increment
2. A second binary record containing:
   a. DIANET, the temperature in eV
   b. FNRHO, the number of densities at that temperature
3. Third, fourth, ..., FNRHO-th binary records containing, per record,
   a. RHO, the density in gm/cc
   b. SMU(k), the array of absorption coefficients for the Ith temperature and Jth density point
      $1 \leq K \leq FIH$
4. Binary records of types 2 and 3 follow until all temperature-density points have been completed

EDSILV was used to prepare the SILVIA, ZSAZSA, and ALOUETTE data for the DASIAC. The EDSILV output tapes are written in IBM compatible BCD format in even parity at 556 BPI. As each binary record is read from the SILVIA-type data tape, the data are written with the formats specified below onto a new data tape. All of the data are preserved in the transfer.

```
00101          SUBROUTINE EDSILV
00101    C     PROGRAM TO READ AND EDIT SILVIA-TYPE-FORMAT TAPE MADE BY ZSASIL
00101    C    1  OR SILVIA OR ALUETO
00101    C
00101    C     THIS PROGRAM HAS BEEN MODIFIED TO WRITE A SILVIA BCD TAPE
00101    C     BY L. R. NORRIS
00101    C
00101    C     THE BCD TAPE MUST BE WRITTEN IN EVEN PARITY AT 556 BPI - THIS IS
00101    C     ACCOMPLISHED BY SPECIFYING THE K,E, AND H OPTIONS ON THE ASSIGN-
00101    C     MENT CARD
00101    C
00101    C
00101    C     CODED BY CHRIS INES APRIL 28, 1967
00101    C
00101    C     ZSASIL, SILVIA, AND ALUETO WRITE DATA TAPES IN THE FOLLOWING
00101    C       FORMAT
00101    C
00101    C       1) A FIRST RECORD CONTAINING
00101    C          A) FNTH, NUMBER OF THETAS
00101    C          B) FIM, NUMBER OF ABSORPTION COEFFICIENTS FOR EACH THETA-RHO
00101    C             POINT
00101    C          C) HNUMIN, VALUE IN THE MIDDLE OF THE FIRST FREQUENCY BAND
00101    C             (WAVES/CM CONVERTED TO EV)
00101    C          D) DHNU, A CONSTANT USED TO INCREMENT THE FREQUENCY
00101    C             (WAVES/CM CONVERTED TO EV)
00101    C
00101    C       2) A SECOND RECORD CONTAINING
00101    C          A) DIANET, TEMPERATURE IN EV
00101    C          B) FNRHO, THE NUMBER OF DENSITIES FOR THAT TEMPERATURE
00101    C
00101    C       3) THIRD, FOURTH,....FNRHO-TH RECORDS CONTAINING, PER RECORD,
00101    C          A) RHO
00101    C          B) SMU(K), THE ARRAY OF ABSORPTION COEFFICIENTS FOR THE
00101    C             I-TH THETA, J-TH RHO POINT.   THE VALUE OF K RANGES FROM
00101    C             1 TO (IM=IFIX(FIM)), THE NUMBER OF ABSORPTION COEFFICIENTS
00101    C
00101    C       4) RECORDS OF TYPES 2 AND 3 FOLLOW UNTIL ALL THETA-RHO POINTS
00101    C          ARE COMPLETED
00101    C
00101    C
00103          DIMENSION THETA(16), RHO(20), SMU(300)
00104          INTEGER SILOUT
00105          SILOUT=       16
00106          REWIND SILOUT
00106    C
00107          READ (5,30) IEDITO, IBCD1
00113       30 FORMAT (2I2)
00113    C     IBCD1          IS THE UNIT ON WHICH THE BCD TAPE IS MOUNTED, UNLESS
00113    C                    IBCD1 = 6
00113    C     IF IBCD1 IS 6, THEN SILVIA DATA CARDS ARE PUNCHED
00113    C     IF IBCD1 IS 6 AND IEDITO IS .NE. 0, THEN IBCD IS SET TO 15
00114          IF ((IBCD1 .EQ. 6) .AND. (IEDITO .NE. 0)) IBCD  = 15
00114    C     IF IEDITO      IS 0, THEN A SILVIA, ZSASIL, OR ALUETO TAPE IS EDITED
00114    C                    IS .LT. 0, THEN A SILVIA, ZSASIL, OR ALUETO TAPE IS
00114    C                    WRITTEN IN BCD ONLY
00114    C                    IS .GT. 0, THEN A SILVIA, ZSASIL, OR ALUETO TAPE IS
00114    C                    WRITTEN IN BCD AND THE BCD TAPE IS EDITED
00114    C     RHO IN GM/CM3
00114    C     THETA IN EV
00114    C
00114    C
00114    C     READ RECORD 1 OF THE ZSASIL (OR SILVIA) TAPE
00116          READ (SILOUT) FNTH,FIM, HNUMIN,DHNU
00116    C
00116    C     FNTH IS WORD 1 OF RECORD 1, NUMBER OF TEMPERATURES
00116    C     FIM IS WORD 2 OF RECORD 1, THE NUMBER OF ABSORPTION COEFFICIENTS
00116    C     HNUMIN IS WORD 3 OF RECORD 1, THE FREQUENCY VALUE AT THE MIDDLE
00116    C       OF THE FIRST BAND (WAVES/CM CONVERTED TO EV)
00116    C     DHNU IS WORD 4 OF RECORD 1, THE FREQUENCY INCREMENT (WAVES/CM
00116    C       CONVERTED TO EV)
00116    C
00124          IM=            IFIX(FIM + .5)
00125          NFNTH=         IFIX(FNTH + .5)
00125    C
00126          IF (IEDITO .NE. 0)
00126         1WRITE (IBCD,3) FNTH, FIM, HNUMIN, DHNU
00135          IF (IBCD1 .NE. 6) GO TO 77
00137          XX = FIM / 9.
00140          KX = IM / 9
00141          AX = KX
00142          IF (XX .GT. AX) KX = KX + 1
```

```
00144         77 CONTINUE
00145            IF (IOCD1 .EQ. 6) PUNCH 3, FNTH,FIH, HNUMIN, DHNU
00154            IF (IEDIT0 .EQ. 0)
00154           1WRITE (6,8002) FNTH, FIH, HNUMIN, DHNU
00163          3 FORMAT (2F5.2,2E15.8)
00164       8002 FORMAT (41H1THE FOLLOWING DATA WAS READ FROM  SILOUT /21H RECORD I
00164           1 CONTAINING ,2X,6HFNTH =,F10.0,6H FIH =,F10.0,9H HNUMIN =,F10.4,
00164           27H DHNU =,F10.4)
00165            IF (IEDIT0 .EQ. 0)
00165           1WRITE (6,8005)
00170       8005 FORMAT (29H0RECORDS 2,3,...,N CONTAINING )
00170     C
00170     C
00170     C      READ  RECORDS CONTAINING TEMPERATURE, NUMBER OF RHO'S, AND
00170     C      ABSORPTION COEFFICIENTS
00170     C
00170     C
00171            DO 10 I=1,NFNTH
00174            READ (SILOUT) DIANET, FNRHO
00174     C
00174     C      FNRHO IS THE NUMBER OF DENSITIES AT EACH THETA
00200            NRHO=        IFIX(FNRHO + .5)
00201            THETA(I)=    DIANET
00202            IF (IEDIT0 .NE. 0)
00202           1WRITE(IBCD,1) DIANET, FNRHO
00207          1 FORMAT (F10.4, F6.2)
00210            IF (IEDIT0 .EQ. 0)
00210           1WRITE (6,8003) DIANET, FNRHO
00215            IF (IOCD1  .EQ. 6) PUNCH 6, DIANET, FNRHO, I
00223          6 FORMAT (F10.4, F6.2, 57X, I3, 4H   0)
00224       8003 FORMAT (10H DIANET = , F10.5,5X, 7HFNRHO = ,1PE10.4)
00225            DO 20 J=1,NRHO
00230            READ (SILOUT) RHO(J), (SMU(K), K=1,IH)
00237            IF (IEDIT0 .NE. 0)
00237           1WRITE (IBCD,2) RHO(J), (SMU(K),K=1,IH)
00247            IF (IOCD1 .NE. 6)  GO TO 75
```

```
00251              KMAX = 0
00252              KK = 1
00253              PUNCH 7, RHO(J), J, KK
00260            7 FORMAT (E8.3, 65X, I3, I4)
00261              DO 70 L=1,KX
00264              KK = L + 1
00265              KMIN = KMAX + 1
00266              KMAX = KMAX + 9
00267              PUNCH 5, (SMU(K),K=KMIN,KMAX), J, KK
00277            5 FORMAT (9E8.3, 1X, I3, I4)
00300           70 CONTINUE
00302           75 CONTINUE
00303            2 FORMAT (E17.5, 15E5.3, / (16E8.3))
00304              IF (IEDITO .EQ. 0)
00304             1WRITE (6,8004) RHO(J), (SMU(K), K=1,IH)
00314         8004 FORMAT (12H0  FOR RHO =,1PE10.4,14H, SMU ARRAY IS /(36X,0P4E15.8))
00315           20 CONTINUE
00317           10 CONTINUE
00317        C
00321              IF (IEDITO .NE.0) END FILE IBCD
00323              REWIND SILOUT
00324              IF (IEDITO .NE.0) REWIND IBCD
00326              IF (IEDITO .EQ. 0) GO TO 31
00330              READ (IBCD,3) FNTH, FIH, HNUMIN, DHNU
00336              WRITE (6,8002) FNTH, FIH, HNUMIN, DHNU
00344              WRITE (6,8005)
00346              NFNTH=          IFIX(FNTH + .5)
00347              IH=             IFIX(FIH + .5)
00350              DO 50 I=1,NFNTH
00352              READ (IBCD,1) DIAMET, FNRHO
00357              WRITE (6,8003) DIAMET, FNRHO
00363              NRHO=           IFIX(FNRHO + .5)
00364              DO 40 J=1,NRHO
00367              READ (IBCD,2) RHO(J), (SMU(K),K=1,IH)
00376              WRITE (6,8004) RHO(J), (SMU(K), K=1,IH)
00405           40 CONTINUE
00407           50 CONTINUE
00411              WRITE (6,42)
00413           42 FORMAT (59H0 A BCD DATA TAPE HAS BEEN WRITTEN AND EDITED SUCCESSFU
00413             1LLY.)
00414              RETURN
00415           31 CONTINUE
00416              IF (IEDITO .EQ. 0) GO TO 7700
00420              WRITE (6,41)
00422           41 FORMAT (48H0 A BCD DATA TAPE HAS BEEN WRITTEN SUCCESSFULLY.)
00423              RETURN
00424         7700 CONTINUE
00425              WRITE (6,7777) SILOUT
00430         7777 FORMAT (66H1 EDSIL RUN COMPLETED SUCCESSFULLY.  SILOUT DATA TAPE W
00430             1AS ON UNIT , I3, 1H.)
00431              RETURN
00432              END

        END OF LISTING.     0 *DIAGNOSTIC* MESSAGE(S).
```

EDSILV contains three write statements. These statements and their respective formats are:

```
      WRITE(IBCD,3) FNTH, FIH, HNUMIN, DHNU
    3 FORMAT(2F6.2, 2E15.8)
      WRITE(IBCD,1) DIANET, FNRHO
    1 FORMAT(F10.4, F6.2)
      WRITE(IBCD,2) RHO(J),(SMU(K),K=1,IH)
    2 FORMAT(E10.5, 15E8.3, / (16E8.3))
```

The first write statement is used once to write the number of temperatures, the number of absorption coefficients for each temperature and density, the frequency value at the center of the first band, and the frequency increment used. The second write statement writes the temperature and the number of densities before a given set of densities and opacity values at that temperature. The last write statement writes the density and all of the absorption coefficient data at that density for each of the densities for a given temperature.

LEVELS: PARTIAL SUMS OF IONIZATION POTENTIALS

LEVELS is a FORTRAN IV subroutine used by AUGEAS in the preparation of tables of the possible states of a group of elements and tables of the transitions between the allowed states for each element. These tables are used by DIAPHANOUS (Ref. 3). LEVELS uses the MARI block data program as the source of the required ionization potentials. These are assembled into partial sums of the form:

$$S_n^i = \sum_{j=\ell}^{n} \phi_j^i; \qquad n = \ell,\ \ell+1,\ \ell+2,\ \ldots,\ Z^i\ ,$$

where ℓ = max (1, Z^i - 14), Z^i is the atomic number of the ith element in

```
      SUBROUTINE LEVELS(NELT,NZ,WI,EIN)
C     THIS PROGRAM SUMS THE IONIZATION POTENTIALS FOR ONE  ELEMENT IN
C     THE MARI DECK EACH TIME THIS ROUTINE IS CALLED UNTIL THE ELEMENTS
C     IN THE MARI DECK HAVE BEEN EXHAUSTED
      COMMON / CMSB / POTENL(5350)
      COMMON/CRNA/K,L
      DIMENSION SUM(100),SUMP(15),EIN(15),Z(100)
C
C     INITIALIZE VARIABLES
      DO 5 I = 1,15
      SUMP(I) = 0.
      EIN(I) = 0.
    5 CONTINUE
C
C     TEST TO SEE IF FIRST TIME THROUGH ROUTINE. IF SO,SKIP TO 10
      IF (NZ .GT. 0) GO TO 10
C
      L = 1
      K = 1
      Z(1) = POTENL(1)
      NZ = Z(1) + .5
      IZ = NZ
      GO TO 60
   10 CONTINUE
C
C     TEST TO SEE IF ARE AT END OF MARI DECK
      IF (K .NE. (-NELT + 1)) GO TO 30
      RETURN
   30 CONTINUE
C     FIND THE NEXT ELEMENT
      Z(K) = POTENL(L)
      NZ = Z(K) + .5
      IZ = NZ
      J = K - 1
      DO 50 I = 1,J
      IF (IFIX(Z(I)+.5) .NE. IZ) GO TO 40
      L = L + IZ + 2
      GO TO 10
   40 CONTINUE
   50 CONTINUE
   60 CONTINUE
      WI = POTENL(L+1)
C
C     CHECK HIGHEST IONIZATION POTENTIAL TO MAKE SURE THIS ELEMENT HAS A
C     COMPLETE SET OF IONIZATION POTENTIALS
      IF (POTENL(L+IZ+1) .GT. 0.) GO TO 70
      L = L + IZ + 2
      GO TO 10
C
   70 CONTINUE
C     SUM UP THE POTENTIALS TO OBTAIN THE DESIRED SUMS
      M1 = MAX0(1,IZ-14)
      SUM(1) = 0.
      DO 200 I = 1,M1
```

```
      SUM(I+1) = SUM(I) + POTENL(L+I+1)
  200 CONTINUE
      SUMP(1) = SUM(M1+1)
      LZ = MIN0(IZ,14)
      IF (IZ .EQ. 1) GO TO 350
      DO 300 I = 1,LZ
      SUMP(I+1) = SUMP(I) + POTENL(M1+I+1+L)
  300 CONTINUE
  350 CONTINUE
C
C     STORE SUMS IN EIN ARRAY
      M = 1
      IF (NZ .GE. 15) LZ = 15
      DO 400 II = 1,LZ
      I = LZ + 1 - II
      EIN(I) = SUMP(M)
      M = M + 1
  400 CONTINUE
      L = L + IZ + 2
      K = K + 1
      WRITE (6,110) NZ,WT,EIN
  110 FORMAT (17H1ATOMIC NUMBER = ,I3,3X,22H GRAM ATOMIC WEIGHT = ,F10.6
     1       , // 3(1X,1P5E15.8/ ))
      RETURN
C
      CALL MARI
      RETURN
      END
      SUBROUTINE MERR
      RETURN
      END
```

the material,

$$\phi_{\ell}^{1} \equiv \sum_{k=1}^{k=\ell} V_k^i \qquad \phi_{j>\ell}^{i} \equiv V_j^i$$

and V_m^i is the mth ionization potential of the ith element where $1 \leq m \leq Z^i$.

AUGEAS was modified to call LEVELS if a blank card replaces the former input set of data cards, on which these partial sums were entered for the several elements (Ref. 3). (AUGEAS can thus be run in either mode.)

DLISTR: A DIAPHANOUS CARD EDIT CODE

The FORTRAN IV program DLISTR was written to prepare edits of DIAPHANOUS data from DYPER4 output cards. These cards contain summaries of the DIAPHANOUS thermodynamic data and approximations to the grey Rosseland and Planck opacities.

Tabular data prepared by DLISTR for most of the presently available DIAPHANOUS tapes are presented in reference 1. The table captions are self-explanatory.

DYPDIN: A RAPID TECHNIQUE FOR MAKING PSEUDO-DIANE TAPES

The DYPDIN program was written to provide extremely rapid response to the need for grey opacities for hydro code usage. DIAPHANOUS or ANN-ANHIST-ANDIMX code summary output is available in card form. These cards are read by DYPDIN and a pseudo-DIANE tape file is created in DIANE-tape format. At the same time, a set of DIANE cards can be punched (refer to DIANE card writeup).

```
      SUBROUTINE OLISTR
C     OLISTR IS A PROGRAM THAT  `ADS AND LISTS DIAPHANOUS OUTPUT CARDS.
C     CODED BY CHRIS INLS  FEBR.  Y,1967
C
C     THIS PROGRAM ASSUMES DIAPHANOUS CARDS OCCUR IN SETS. ONE SET PER
C        DIAPHANOUS RUN.
C     THIS PROGRAM ASSUMES AT LEAST ONE SUCH SET IS INPUT.
C
C     THE FIRST TWO CARDS OF A GIVEN SET CONTAIN COMMENTS ABOUT THAT SET.
C        THESE CARDS MAY SPECIFY ANY MESSAGE THE PROGRAMMER DESIRES, OR
C        THEY MAY BE LEFT BLANK.
C
C     THE THIRD CARD OF A GIVEN SET IS A TITLE CARD WHICH IS IDENTICAL TO
C        THE TITLE ON THE CORRESPONDING DIAPHANOUS OUTPUT TAPE, THE DIAPHANOUS
C        OUTPUT PRINTOUT, AND THE DIAPHANOUS OUTPUT PLOTS FROM THE RUN WHICH
C        PRODUCED THIS CARD SET.
C
C     THE FOURTH CARD OF A GIVEN SET IS A 'THETA' CARD.  IT CONTAINS ONLY
C        A VALUE FOR THETA.  IT IS FOLLOWED BY ONE OR MORE 'RHO' CARDS, EACH OF
C        WHICH CONTAINS THE FOLLOWING DATA
C        1. RHO
C        2. PRESSURE (PRESHR)
C        3. ENERGY
C        4. EION
C        5. KROS (CAPAR)
C        6. KPLK (CAPAC)
C        7. ZBAR
C        8. EGAM
C        THESE CARDS CONTINUE UNTIL THE NEXT THETA CARD FOR THAT MATERIAL,
C        OR UNTIL A NEW OLISTR CONTROL CARD IS ENCOUNTERED.
C
C
C     O L I S T R   C O N T R O L   C A R D S
C     THERE ARE TWO TYPES OF OLISTR CONTROL CARDS
C
C     VARIABLE NAME  COLUMNS  FORMAT  MEANING
C
C        DO ME         1-6      A6     DO ME HAS ONLY THREE VALUES
C                                      1. IF(DO ME.EQ.START) THE RUN BEGINS,
C                                         OLISTR WRITES MESSAGES AND EXPECTS
C                                         TO READ ANOTHER CONTROL CARD.
C                                      2. IF(DO ME.EQ.NEWSET) CODE EXPECTS TO
C                                         BEGIN READING AND LISTING DIAPHANOUS
C                                         OUTPUT CARDS.
C                                      3. IF(DO ME.EQ.ENDRUN) CODE CALLS EXIT.
C        ICHECK        67-72    F6.3   ICHECK HAS ONLY THREE VALUES
C                                      1. IF(ICHECK.LT.0) OLISTR EXPECTS
C                                         READ ANOTHER 'DO ME' CARD.
C                                      2. IF(ICHECK.EQ.0) CODE ASSUMES IT
C                                         IS READING A THETA CARD
C                                      3. IF(ICHECK.GT.0) CODE ASSUMES IT
C                                         IS READING A RHO CARD
C
C
C
C     TO RUN OLISTR, THE CONTROL CARDS MUST BE PLACED CORRECTLY.
C     THE FIRST DATA CARD OF ANY RUN MUST CONTAIN THE WORD 'START' AS
C       THE VALUE OF THE VARIABLE 'DO ME'.  IT ALSO CONTAINS THE NAME OF THE
C       PERSON DOING THE RUN AND THE DATE OF THE RUN
C
C     VARIABLE NAME   COLUMNS   FORMAT   VALUE
C
C        DO ME          1-6       A6     START
C        LISTER         7-24      3A6    (NAME OF PERSON DOING RUN)
```

```
00101    C          MONTH          25-30        A6        (CURRENT MONTH)
00101    C           DAY           31-33        A3        (CURRENT DAY)
00101    C          YEAR           34-37        A4        (CURRENT YEAR)
00101    C          TYPE           41-47        A6        TYPE.EQ.NORMAL IF STANDARD GAMMA SET;
00101    C                                                TYPE.EQ.0 IF NON-STANDARD GAMMA SET
00101    C
00101    C      THE SECOND DATA CARD OF ANY RUN MUST CONTAIN THE WORD 'NEWSET'
00101    C        AS THE VALUE OF THE VARIABLE 'DO ME'.  'NEWSET' MEANS A SET
00101    C        OF DIAPHANOUS OUTPUT CARDS WILL BE READ IN NEXT.
00101    C
00101    C      FOLLOWING THE SECOND DATA CARD IS THE SET OF DIAPHANOUS OUTPUT CARDS.
00101    C
00101    C      ***** NOTE - TWO HEADER CARDS, FORMAT(12A6/9A6),MUST PRECEDE
00101    C                   EACH COMPLETE DIAPHANOUS OUTPUT CARD SET         *****
00101    C
00101    C
00101    C      FOLLOWING THE LAST DATA CARD OF ANY PARTICULAR DIAPHANOUS OUTPUT CARD
00101    C        SET IS A CONTROL CARD WITH A NEGATIVE NUMBER IN COLUMNS 67-72,
00101    C        AS THE VALUE OF 'ICHECK'.
00101    C        WHEN THIS CARD IS READ, CODE EXPECTS THE NEXT CARD READ TO BE A
00101    C        DLISTR CONTROL CARD WITH A VALUE FOR 'DO ME'.
00101    C      IF THE FOLLOWING CARD CONTAINS 'NEWSET' AS THE VALUE OF 'DO ME', THE
00101    C        PROGRAM WILL EXPECT TO READ ANOTHER DIAPHANOUS OUTPUT CARD SET.
00101    C        IF THAT CARD, HOWEVER, CONTAINS 'ENDRUN' AS THE VALUE OF 'DO ME', THE
00101    C        PROGRAM WILL EXIT NORMALLY.
00101    C
00101    C      CODE WILL EXPECT TO READ A CONTROL CARD HAVING 'START' AS THE VALUE
00101    C        OF 'DO ME' ONLY ONCE; AS THE FIRST DATA CARD OF ANY DLISTR RUN.
00101    C      CODE WILL EXPECT TO READ A CONTROL CARD HAVING 'ENDRUN' AS THE VALUE
00101    C        OF 'DO ME' ONLY ONCE; AS THE LAST DATA CARD OF ANY DLISTR RUN.
00101    C
00101    C      EACH DIAPHANOUS OUTPUT CARD SET MUST BE PRECEDED BY A DLISTR CONTROL CARD
00101    C        HAVING 'NEWSET' AS THE VALUE OF 'DO ME'.
00101    C      EACH DIAPHANOUS OUTPUT CARD SET MUST BE FOLLOWED BY A DLISTR CONTROL CARD
00101    C        HAVING A NEGATIVE NUMBER AS THE VALUE OF 'ICHECK'.
00101    C
00103           INTEGER DO ME, ENDRUN, START, TYPE
00104           INTEGER HEADER,REMARK
00105           DIMENSION LISTER(3)
00106           DIMENSION REMARK(24), HEADER(12), WORD(8)
00107           DIMENSION TEMSTO(500)
00110           DIMENSION GAMMA(13)
00110    C
00110    C      DLISTR CONTROL CARDS
00111           DATA ENDRUN/6HENDRUN/
00113           DATA NEWSET/6HNEWSET/
00115           DATA START/6HSTART /
00117           DATA NORMAL/6HNORMAL/
00121           DATA GAMMA/20., 100., 500., 2.5E3, 1.25E4, 6.25E4, 3.4E5, 2.E6,
00121          1           1.3E7, 1.E8, 8.5E8, 8.E9, 8.5E10/
00121    C
00121    C      F O R M A T S
00121    C
00123      7000 FORMAT (126H ************************************* CURRENT DIAPHA
```

```
00123          INOUS DATA VALUES FOR SELECTED MATERIALS **************************
00123          2*******)
00124     7002 FORMAT (1H1,12A6,9A6)
00125     7003 FORMAT (        122H  THETA SETS DONE FOR GAMMA VALUES OF  20.,100.
00125         1,500.,2.5+03,1.25+04,6.25+04,3.4+05,2.+06,1.3+07,1.+08,8.5+08,8.+0
00125         29,8.5+10 )
00126     7004 FORMAT (1X,12A6)
00127     7500 FORMAT (5A6,A3,A4,3X,A6)
00130     7501 FORMAT (42X,13HLIST MADE BY ,3A6,3HON ,A6,A3,1X,A4)
00131     7502 FORMAT (1H1)
00132     7503 FORMAT (12A6/9A6/12A6)
00133     7505 FORMAT  (/8H THETA = ,1PE10.4, 15H ELECTRON VOLTS)
00134     7506 FORMAT (1P6E10.4,0P2F6.3)
00135     7507 FORMAT (13H   RHO(G/CM3),9X,7HP(BARS),10X,11HENG(ERGS/G),6X,  12HE
00135         1ION(ERGS/G),6X,11HKROS(CM2/G),7X,11HKPLK(CM2/G),10X,4HZBAR, 8X,
00135         24HEGAM/(6(1PE12.4,6X),2(2X,0PF8.3,2X)))
00136     7600 FORMAT (80HODLISTR CONTROL CARD ERROR. CHECK FOR MISSPELLED WORD O
00136         1R MISPLACED CARD IN NSET= ,I3,1H.)
00137     7601 FORMAT (88H1DIAPHANOUS CARD ERROR. DLISTR WAS EXPECTING TO READ A
00137         1THETA CARD, BUT IT FOUND WORD(2)= ,E12.4 / 46HOCHECK FOR MISPLACED
00137         2 OR MISSING CARD IN NSET= ,I3,1H.)
00140     7602 FORMAT (100H1DIAPHANOUS CARD ERROR. DLISTR WAS EXPECTING TO READ A
00140         1 THETA CARD. BUT IT FOUND A CARD WITH THETA=0./36HOCHECK FOR AN IN
00140         2VALID CARD IN NSET= ,I3,1H.)
00141     7603 FORMAT (119H1DIAPHANOUS CARD INPUT ERROR. DLISTR WAS EXPECTING TO
00141         1READ THE FIRST RHO CARD, BUT THE CARD IT READ HAS A VALUE OF ZERO/
00141         255HOFOR THE PRESSURE.  CHECK FOR AN INVALID CARD IN NSET= ,I3,1H.)
00142     7604 FORMAT (121H1DIAPHANOUS CARD INPUT ERROR. DLISTR WAS EXPECTING TO
00142         1READ THE FIRST RHO CARD, BUT THE CARD IT READ HAS A VALUE LESS THA
00142         2N/46H01 FOR K.  CHECK FOR AN INVALID CARD IN NSET= ,I3,1H.)
00143     7605 FORMAT (111H1DIAPHANOUS CARD INPUT ERROR. DLISTR WAS EXPECTING TO
00143         1READ A RHO CARD, BUT THE CARD IT READ HAS A VALUE OF ZERO/47HOFOR
00143         2RHO.  CHECK FOR AN INVALID CARD IN NSET= ,I3,1H.)
00144     7900 FORMAT (1H1,42X,48HLISTING OF DIAPHANOUS OUTPUT CARDS IS COMPLETED
00144         1.)
00144     C
00144     C
00144     C      B E G I N   T H E   R U N
00145          NSET=   -1
00146      500 CONTINUE
00147          NSET=   NSET+1
00150          READ (5,7500) DO ME, (LISTER(L),L=1,3), MONTH, DAY, YEAR, TYPE
00163            IF (DO ME .EQ. ENDRUN) GO TO 530
00165            IF (DO ME .EQ. START) GO TO  510
00167            IF (DO ME .EQ. NEWSET) GO TO 520
00171          GO TO 600
00171     C    DO ME .EQ. START
00172      510 CONTINUE
00173          WRITE (6,7502)
00175          WRITE (6,7000)
00177          WRITE (6,7501)(LISTER(L),L=1,3), MONTH, DAY, YEAR
00210          GO TO 500
00210     C    DO ME .EQ. NEWSET.  START READING DIAPHANOUS OUTPUT CARD SET
00211      520 CONTINUE
```

```
00212                   IF (INSET .EQ. 0) GO TO 600
00214                 KOUNTT = 1
00215                 READ (5,7503) (REMARK(II),II=1,21), (HEADER(JJ),JJ=1,12)
00227                 WRITE (6,7002) (REMARK(II),II=1,21)
00227          C
00227          C      K COUNTS THE NUMBER OF RHO CARDS FOR A GIVEN THETA.  K=0 FOR THE
00227          C        THETA CARD, AND K=1,2,...,N FOR THE NTH RHO CARD.
00235                 K=       -1
00236                   IF (TYPE .EQ. NORMAL) GO TO 1
00240                 GO TO 550
00240          C
00240          C      TYPE .EQ. NORMAL,  PRINT OUT STANDARD GAMMA SET
00241               1 CONTINUE
00242                 WRITE (6,7003)
00242          C
00244             550 CONTINUE
00245                 WRITE (6,7004) (HEADER(JJ), JJ=1,12)
00253             540 CONTINUE
00253          C      READ DATA CARD AND CHECK TO SEE WHETHER IT IS A CONTROL CARD, OR A
00253          C      DIAPHANOUS THETA OR RHO CARD
00254                 K=       K + 1
00255                 READ (5,7506) (WORD(N), N=1,8)
00263                   IF (WORD(8) .LT. 0.) GO TO 521
00263          C      WORD(8) .LT. 0. MEANS A CONTROL CARD SIGNALING THE END OF THAT
00263          C        DIAPHANOUS OUTPUT CARD SET WAS READ
00263          C
00265                   IF (WORD(8) .GT. 0.) GO TO 524
00265          C      WORD(8) .GT. 0. MEANS A RHO CARD WAS JUST READ
00265          C
00265          C      PAST THIS POINT WE SHOULD HAVE ONLY THETA CARDS.  WORD(1).LE.0. .OR.
00265          C        WORD(2).NE.0. IS AN ERROR ON A THETA CARD.
00265          C
00267   *DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
00267                   IF (WORD(2) .NE. 0.) GO TO 523
00271   *DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
00271                   IF (WORD(1) .LE. 0.) GO TO 522
00273                   IF (K .GE. 1) GO TO 528
00275                 WRITE (6,7505) WORD(1)
00300                 GO TO 540
00301             600 CONTINUE
00302                 M =       1
00303                 GO TO 529
00303          C
00303          C      ICHECK.GT.0., CHECK VALUES OF K, WORD(1), AND WORD(2)
00303          C      EXPECT THAT A RHO CARD IS BEING READ
00304             524 CONTINUE
00305                   IF (K .EQ. 1) GO TO 400
00307             529 CONTINUE
00310                   IF (K .LT. 1) GO TO 531
00312   *DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
00312                   IF (WORD(2) .EQ. 0.) GO TO 525
00312          C
00312          C
00312          C      PUT THE VALUES FROM THE RHO CARD INTO TEMPORARY STORAGE
```

```
  526 CONTINUE
      DO 527 NN=1,8
      TEMSTO(M)= WORD(NN)
      M=       M+1
  527 CONTINUE
      GO TO 540
C
C     WRITE DIAPHANOUS OUTPUT CARD SET
  528 CONTINUE
  701 CONTINUE
      KK=      8 * (K-1)
      WRITE (6,7507) (TEMSTO(L), L=1,KK)
      K=       0
C     K COUNTS THE NUMBER OF RHO CARDS FOR A GIVEN THETA.  K=0 FOR THE
C       THETA CARD, AND K=1,2,...,N FOR THE NTH RHO CARD.
        IF (WORD(8) .LT. 0.) GO TO 500
      KOUNTT = KOUNTT+1
      IF (KOUNTT.GT.3)  WRITE (6,7502)
      IF (KOUNTT.GT.3)  KOUNTT=1
      WRITE (6,7505) WORD(1)
      GO TO 540
C
C     NORMAL EXIT POINT
  530 CONTINUE
        IF (NSET .EQ. 0) GO TO 600
      WRITE (6,7502)
      WRITE (6,7900)
      RETURN
C
  521 CONTINUE
        IF (K .LE. 1) GO TO 600
      GO TO 701
C
C     E R R O R   E X I T S
C
C     ERROR FOUND IN CHECKING THE VALUES OF A THETA CARD)  THETA.EQ.0.
  522 CONTINUE
      WRITE (6,7502)
      WRITE (6,7602) NSET
      RETURN
C
C     ERROR FOUND IN CHECKING THE VALUES OF A THETA CARD)  WORD(2) .NE. 0
  523 CONTINUE
      WRITE (6,7502)
      WRITE (6,7601) WORD(2), NSET
      RETURN
C
C     ERROR FOUND IN CHECKING A RHO CARD:  WORD(2) .EQ. 0.
  525 CONTINUE
      WRITE (6,7502)
      WRITE (6,7603) NSET
      RETURN
C
C     ERROR FOUND IN CHECKING A RHO CARD) K.LT.1
  531 CONTINUE
      WRITE (6,7502)
      WRITE (6,7604) NSET
      RETURN
C
C     ERROR FOUND IN CHECKING A RHO CARD) WORD(1).EQ.0.
  532 CONTINUE
      WRITE (6,7502)
      WRITE (6,7605) NSET
      RETURN
C
C     DLIST CONTROL CARD ERROR
  600 CONTINUE
      WRITE (6,7502)
      WRITE (6,7600) NSET
      RETURN
      END

    END OF LISTING.     3 *DIAGNOSTIC* MESSAGE(S).
```

Input for DYPDIN

CARD NO.	COLUMNS	FORMAT	DESCRIPTION
1	1-12	I12	IDA: a right-justified DIANE run identification number
2	1-72	12A6	The DIANE tape title
3	1-2	I2	UNIT: tape mounting unit
3	5-6	I2	ID0 : if 0, write tape and punch DIANE cards. If 1, only punch DIANE cards. If 2, only write tape

```
      SUBROUTINE DYPDIN
C
C     PROGRAM TO READ DIAPHANOUS-TYPE OUTPUT DATA CARDS AND PUNCH
C       DIANTC-FORMAT DATA CARDS AND/OR WRITE A DIANE NEW-FORMAT-STYLE
C       DATA TAPE (ONE FREQUENCY GROUP ONLY)
C
C
      DIMENSION ID(12),WORD(8),BUFS(1000),TEMSTO (100)
      DATA  K/-1/,M/1/, IWD/1/,KCOUNT/0/,KK/0/,HNUT/1./,X1/-1.E6/
      INTEGER UNIT
C
      READ(5,7000) IDA, ID,UNIT, IDO
 7000 FORMAT ( I12/ 12A6/ I2,2X,I2)
      WRITE (6,700) IDA, ID, UNIT, IDO
  700 FORMAT ( 18H INPUT AS READ IS / 5X,7H IDA = ,I12 / 5X,6H ID = ,
     1          12A6 / 5X, 8H UNIT = ,I2 / 5X, 7H IDO = ,I2)
C
C     IDA  IS A 12 DIGIT IDENTIFICATION NUMBER, RIGHT JUSTIFIED
C     ID   IS A  HEADER CARD ARRAY
C
C     IDO=0  IF WRITE TAPE AND PUNCH CARDS
C     IDO=1  IF PUNCH CARDS ONLY
C     IDO=2  IF WRITE TAPE ONLY
C
C     READ DIAPHANOUS-TYPE DATA CARDS
C
    1 CONTINUE
      READ(5,7001) (WORD(N), N=1,8)
 7001 FORMAT(6E10.4,2F6.3)
      K=K+1
C
C     WORD(8).GT.0. MEANS A RHO CARD WAS JUST READ
      IF(WORD(8).GT.0.) GO TO 10
C
      IF (K .GE. 1) GO TO 20
      BUFS(IWD)= ALOG(WORD(1))
      GO TO 1
C
C
   10 CONTINUE
      IF (K.EQ.1) M=2
   11 CONTINUE
C
      TEMSTO (M) = ALOG(WORD(5))
      TEMSTO (M+1) = ALOG (WORD(6))
      TEMSTO (M+2) =-ALOG (WORD(1))
      M=M+3
      GO TO 1
C
C
   20 CONTINUE
      KK= 3 *(K-1) +KK
      TEMSTO(1)= K-1
      MM=            M - 1
C
      DO 21  MMM=1,MM
      IIWD = IWD + MMM
      BUFS(IIWD) = TEMSTO (MMM)
```

```
00202         21 CONTINUE
00204            IWD = I1WD+1
00205            K=0
00206            KCOUNT = KCOUNT + 1
00206      C
00207            KWORD=        WORD(1) + .5
00210              IF (KWORD .EQ. 0) GO TO 30
00212            BUFS(IWD)= ALOG(WORD(1))
00213            GO TO 1
00213      C
00214         30 CONTINUE
00215            FNWD=         2 * KCOUNT + KK
00216            X2= KCOUNT
00217            IF (IDO.EQ.2) GO TO 40
00221            PUNCH 7503,IDA
00224       7503 FORMAT (I12)
00225            PUNCH 7504, (ID(I),I=1,12)
00233       7504 FORMAT (12A6)
00234            PUNCH 7505, HNUT,FNWD
00240       7505 FORMAT (6E12.7)
00241            NWD= FNWD
00242            IF(NWD.GT.1000)CALL MERR
00244            XX= FNWD/6.
00245            KX = NWD/6
00246            AX= KX
00247            IF(XX.GT.AX) KX= KX+1
00251            DO 31 I=1,2
00254            IX=I
00255            IF (I.EQ.2) X1=.001
00257            PUNCH 7507,X1,X2,IX
00264       7507 FORMAT(2E12.7,49X,I3,4H   0)
00265            KMAX=0
00266            DO 31 KLIND=1,KX
00271            KKLIND= KLIND
00272            KMIN= KMAX +1
00273            KMAX= KMAX +6
00274            PUNCH 7506,((BUFS(IWD),IWD=KMIN,KMAX),IX,KKLIND)
00304       7506 FORMAT (6E12.7,1X,I3,I4)
00305         31 CONTINUE
00310            NOC = 2*(KX+1) + 3
00311            WRITE (6,7508) NOC
00314       7508 FORMAT (38H PUNCHING IS COMPLETED NO. OF CARDS = ,I8)
00315            IF(IDO.EQ.1) GO TO 50
00317         40 CONTINUE
00320            REWIND UNIT
00321            WRITE (UNIT) IDA,(ID(I),I=1,12)
00330            WRITE (UNIT) HNUT,FNWD
00334            DO 41 I=1,2
00337            X1=           -1.E6
00340              IF (I .EQ. 2) X1 = .001
00342            WRITE (UNIT) X1,X2
00346            WRITE (UNIT) (BUFS(IWD),IWD=1,NWD)
00354         41 CONTINUE
00356            END FILE UNIT
00357            REWIND UNIT
00360            WRITE (6,7601) UNIT
00363       7601 FORMAT (30H DIANE TAPE WRITTEN ON UNIT = ,I2)
00364            CALL EDIANE(10,0)
00364      C
00364      C
00365         50 CONTINUE
00366            WRITE (6,7602)
00370       7602 FORMAT ( 22H DYPDIN RUN COMPLETED.)
00370      C
00371            RETURN
00372            END

    END OF LISTING.     0 *DIAGNOSTIC* MESSAGE(S).
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APPENDIX I

AIRMOL AND CMOL DATA TABULATED BY GOLEM

AIRMOL RESULTS

The following output illustrates AIRMOL/EIONX answers for selected temperature-density rectangles (TRAIL = 7.) done by GOLEM. The column captions refer to:

COLUMN	NAME	UNITS	MEANING
1	THETA	^{o}K	temperature; ordinarily given in eV ($1\ eV = 11605.4^{o}K$)
2	RHO	gm/cc	ρ, density
3	P1	atm	
4	E	ergs/gm	specific internal energy; includes $E_o \simeq 2.9 \times 10^{11}$ ergs/gm
5	NBAR EIONIZ		NBAR, the mean no. of atoms/molecule, is printed when NBAR $\neq$ 1. EIONIZ, the ionization contribution to the specific internal energy, is printed when NBAR = 1
6	SYNPOT		SYNPOT = $\theta_{eV}\ \ell n\,\Gamma\quad [\Gamma \simeq 0.01A\ \theta^{3/2}/(\rho\bar{Z})]$ ($A \simeq 14.549$ for AIRMOL)
7	FEW		FEW $\equiv$ ZBAR $\equiv \bar{Z}$, the mean ion charge
8	CV	ergs/gm/eV	$CV \equiv (\frac{\partial E}{\partial \theta})_\rho$; θ in eV
9	PB1	ergs/cc	$PB1 \equiv (\frac{\partial E}{\partial \tau})_\theta$; $\tau = 1/\rho$
10	ASQ	cm/sec	equilibrium sound speed
11	EGAM		$1 + P/[\rho(E-E_o)]$; $E_o \simeq 2.9 \times 10^{11}$ ergs/gm for AIRMOL
12	EGAM2		$1 + P/(\rho E)$

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASO	EGAW	EGAM2/ GAMMA
5.000+02	1.293-10	1.832-07	3.668+09	1.991+00	2.679+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-09	1.832-06	3.668+09	1.991+00	2.580+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-08	1.832-05	3.668+09	1.991+00	2.480+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-07	1.832-04	3.668+09	1.991+00	2.381+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-06	1.832-03	3.668+09	1.991+00	2.282+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-05	1.832-02	3.668+09	1.991+00	2.183+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-04	1.832-01	3.668+09	1.991+00	2.084+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-03	1.832+00	3.668+09	1.991+00	1.984+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-02	1.832+01	3.668+09	1.991+00	1.885+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293-01	1.832+02	3.668+09	1.991+00	1.786+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
5.000+02	1.293+00	1.832+03	3.668+09	1.991+00	1.687+00	.00000	8.987+10	0.000	4.436+04	9.950-01	1.391+00
1.000+03	1.293-10	3.663-07	7.719+09	1.991+00	5.447+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-09	3.663-06	7.719+09	1.991+00	5.249+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-08	3.663-05	7.719+09	1.991+00	5.051+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-07	3.663-04	7.719+09	1.991+00	4.852+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-06	3.663-03	7.719+09	1.991+00	4.654+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-05	3.663-02	7.719+09	1.991+00	4.455+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-04	3.663-01	7.719+09	1.991+00	4.257+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-03	3.663+00	7.719+09	1.991+00	4.058+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-02	3.663+01	7.719+09	1.991+00	3.860+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293-01	3.663+02	7.719+09	1.991+00	3.662+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.000+03	1.293+00	3.663+03	7.719+09	1.991+00	3.463+00	.00000	9.789+10	0.000	6.203+04	9.898-01	1.372+00
1.500+03	1.293-10	5.503-07	1.236+10	1.988+00	8.014+00	.00000	1.316+11	1.540-02	7.392+04	9.845-01	1.349+00
1.500+03	1.293-09	5.497-06	1.220+10	1.990+00	7.952+00	.00000	1.187+11	4.893-02	7.442+04	9.845-01	1.353+00
1.500+03	1.293-08	5.496-05	1.215+10	1.990+00	7.654+00	.00000	1.108+11	1.549-01	7.489+04	9.845-01	1.355+00
1.500+03	1.293-07	5.495-04	1.213+10	1.991+00	7.357+00	.00000	1.083+11	4.901-01	7.506+04	9.845-01	1.355+00
1.500+03	1.293-06	5.495-03	1.212+10	1.991+00	7.059+00	.00000	1.073+11	1.551+00	7.512+04	9.845-01	1.355+00
1.500+03	1.293-05	5.495-02	1.212+10	1.991+00	6.762+00	.00000	1.071+11	4.900+00	7.514+04	9.845-01	1.355+00
1.500+03	1.293-04	5.495-01	1.212+10	1.991+00	6.464+00	.00000	1.070+11	1.552+01	7.515+04	9.845-01	1.355+00
1.500+03	1.293-03	5.495+00	1.212+10	1.991+00	6.166+00	.00000	1.070+11	4.837+01	7.515+04	9.845-01	1.355+00
1.500+03	1.293-02	5.495+01	1.212+10	1.991+00	5.869+00	.00000	1.070+11	1.640+02	7.515+04	9.845-01	1.355+00
1.500+03	1.293-01	5.495+02	1.212+10	1.991+00	5.571+00	.00000	1.070+11	5.600+02	7.515+04	9.845-01	1.355+00
1.500+03	1.293+00	5.495+03	1.212+10	1.991+00	5.273+00	.00000	1.070+11	1.152+03	7.515+04	9.845-01	1.355+00
2.000+03	1.293-10	8.240-07	3.806+10	1.770+00	8.509+00	.00000	1.148+12	7.819-01	8.392+04	9.744-01	1.170+00
2.000+03	1.293-09	7.719-06	2.603+10	1.889+00	8.310+00	.00000	7.797+11	5.006+00	8.155+04	9.771-01	1.232+00
2.000+03	1.293-08	7.464-05	2.012+10	1.954+00	8.112+00	.00000	3.778+11	1.961+01	8.143+04	9.783-01	1.291+00
2.000+03	1.293-07	7.371-04	1.798+10	1.978+00	7.913+00	.00000	2.062+11	6.622+01	8.290+04	9.788-01	1.321+00
2.000+03	1.293-06	7.341-03	1.727+10	1.987+00	7.715+00	.00000	1.469+11	2.138+02	8.444+04	9.789-01	1.333+00
2.000+03	1.293-05	7.331-02	1.705+10	1.989+00	7.516+00	.00000	1.277+11	6.804+02	8.527+04	9.789-01	1.337+00
2.000+03	1.293-04	7.328-01	1.697+10	1.990+00	7.318+00	.00000	1.215+11	2.156+03	8.559+04	9.790-01	1.338+00
2.000+03	1.293-03	7.327+00	1.695+10	1.991+00	7.120+00	.00000	1.196+11	6.817+03	8.570+04	9.790-01	1.339+00
2.000+03	1.293-02	7.327+01	1.694+10	1.991+00	6.922+00	.00000	1.190+11	2.151+04	8.573+04	9.790-01	1.339+00
2.000+03	1.293-01	7.326+02	1.694+10	1.991+00	6.687+00	.00000	1.188+11	6.755+04	8.575+04	9.790-01	1.339+00
2.000+03	1.293+00	7.326+03	1.694+10	1.991+00	6.455+00	.00000	1.187+11	2.097+05	8.575+04	9.790-01	1.339+00
2.500+03	1.293-10	1.107-06	5.688+10	1.647+00	8.966+00	.00000	1.290+11	2.172-02	1.071+05	9.628-01	1.152+00
2.500+03	1.293-09	1.101-05	5.582+10	1.656+00	8.718+00	.00000	2.198+11	1.337+00	1.027+05	9.632-01	1.155+00
2.500+03	1.293-08	1.067-04	4.983+10	1.708+00	8.470+00	.00000	6.091+11	5.935+01	9.718+04	9.652-01	1.168+00
2.500+03	1.293-07	9.969-04	3.705+10	1.829+00	8.222+00	.00000	7.042+11	6.936+02	9.342+04	9.691-01	1.211+00
2.500+03	1.293-06	9.469-03	2.791+10	1.925+00	7.974+00	.00000	4.086+11	3.344+03	9.191+04	9.717-01	1.266+00
2.500+03	1.293-05	9.263-02	2.413+10	1.968+00	7.726+00	.00000	2.308+11	1.203+04	9.256+04	9.727-01	1.301+00
2.500+03	1.293-04	9.192-01	2.283+10	1.983+00	7.478+00	.00000	1.637+11	3.959+04	9.375+04	9.730-01	1.315+00

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASQ	EGAM	EGAM2/ GAMMA
2.500+03	1.293-03	9.169+00	2.241+10	1.988+00	7.230+00	.00000	1.413+11	1.268+05	9.447+04	9.731-01	1.321+00
2.500+03	1.293-02	9.161+01	2.228+10	1.990+00	6.982+00	.00000	1.341+11	4.026+05	9.475+04	9.732-01	1.322+00
2.500+03	1.293-01	9.159+02	2.224+10	1.990+00	6.734+00	.00000	1.310+11	1.276+06	9.485+04	9.732-01	1.323+00
2.500+03	1.293+00	9.158+03	2.222+10	1.991+00	6.486+00	.00000	1.311+11	4.043+06	9.488+04	9.732-01	1.323+00
3.000+03	1.293-10	1.338-06	6.423+10	1.635+00	9.427+00	.00000	2.941+11	1.635-01	1.107+05	9.536-01	1.163+00
3.000+03	1.293-09	1.331-05	6.245+10	1.643+00	9.129+00	.00000	1.722+11	5.833-01	1.144+05	9.541-01	1.167+00
3.000+03	1.293-08	1.327-04	6.159+10	1.649+00	8.832+00	.00000	1.495+11	5.472+00	1.158+05	9.545-01	1.169+00
3.000+03	1.293-07	1.312-03	5.944+10	1.668+00	8.534+00	.00000	2.497+11	2.412+02	1.116+05	9.554-01	1.173+00
3.000+03	1.293-06	1.254-02	5.096+10	1.745+00	8.236+00	.00000	5.176+11	6.950+03	1.061+05	9.589-01	1.193+00
3.000+03	1.293-05	1.172-01	3.879+10	1.867+00	7.939+00	.00000	4.557+11	5.640+04	1.025+05	9.634-01	1.237+00
3.000+03	1.293-04	1.125+00	3.184+10	1.944+00	7.641+00	.00000	2.752+11	2.397+05	1.016+05	9.658-01	1.277+00
3.000+03	1.293-03	1.108+01	2.919+10	1.975+00	7.344+00	.00000	1.870+11	8.304+05	1.022+05	9.667-01	1.297+00
3.000+03	1.293-02	1.102+02	2.829+10	1.986+00	7.046+00	.00000	1.555+11	2.703+06	1.028+05	9.670-01	1.305+00
3.000+03	1.293-01	1.100+03	2.801+10	1.989+00	6.748+00	.00000	1.451+11	8.633+06	1.031+05	9.671-01	1.308+00
3.000+03	1.293+00	1.099+04	2.792+10	1.990+00	6.451+00	.00000	1.418+11	2.747+07	1.032+05	9.671-01	1.309+00
3.500+03	1.293-10	1.688-06	1.012+11	1.512+00	9.889+00	.00000	1.827+12	2.074+00	1.195+05	9.299-01	1.131+00
3.500+03	1.293-09	1.596-05	7.803+10	1.599+00	9.542+00	.00000	7.137+11	7.287+00	1.177+05	9.410-01	1.160+00
3.500+03	1.293-08	1.564-04	7.015+10	1.631+00	9.195+00	.00000	3.108+11	2.443+01	1.197+05	9.442-01	1.173+00
3.500+03	1.293-07	1.551-03	6.733+10	1.645+00	8.847+00	.00000	1.867+11	1.081+02	1.230+05	9.454-01	1.181+00
3.500+03	1.293-06	1.534-02	6.502+10	1.663+00	8.500+00	.00000	2.022+11	2.001+03	1.222+05	9.465-01	1.185+00
3.500+03	1.293-05	1.477-01	5.805+10	1.728+00	8.153+00	.00000	3.720+11	6.081+04	1.168+05	9.501-01	1.199+00
3.500+03	1.293-04	1.361+00	4.619+10	1.848+00	7.806+00	.00000	3.841+11	6.025+05	1.122+05	9.556-01	1.234+00
3.500+03	1.293-03	1.319+01	3.845+10	1.935+00	7.459+00	.00000	2.573+11	2.774+06	1.105+05	9.589-01	1.269+00
3.500+03	1.293-02	1.295+02	3.534+10	1.972+00	7.111+00	.00000	1.858+11	9.859+06	1.105+05	9.601-01	1.287+00
3.500+03	1.293-01	1.286+03	3.428+10	1.984+00	6.764+00	.00000	1.592+11	3.238+07	1.108+05	9.606-01	1.294+00
3.500+03	1.293+00	1.283+04	3.393+10	1.989+00	6.417+00	.00000	1.503+11	1.040+08	1.110+05	9.607-01	1.296+00
4.000+03	1.293-10	2.518-06	2.360+11	1.158+00	1.035+01	.00002	3.583+12	5.502+00	1.462+05	6.341-01	1.084+00
4.000+03	1.293-09	2.108-05	1.455+11	1.384+00	9.955+00	.00001	2.617+12	3.968+01	1.338+05	8.856-01	1.114+00
4.000+03	1.293-08	1.891-04	9.773+10	1.542+00	9.559+00	.00000	1.131+12	1.614+02	1.276+05	9.229-01	1.152+00
4.000+03	1.293-07	1.810-03	7.991+10	1.612+00	9.162+00	.00000	4.632+11	5.609+02	1.272+05	9.325-01	1.177+00
4.000+03	1.293-06	1.778-02	7.360+10	1.641+00	8.765+00	.00000	2.381+11	2.238+03	1.298+05	9.356-01	1.189+00
4.000+03	1.293-05	1.748-01	6.973+10	1.669+00	8.368+00	.00000	2.143+11	2.745+04	1.301+05	9.378-01	1.196+00
4.000+03	1.293-04	1.671+00	6.173+10	1.745+00	7.971+00	.00000	3.212+11	6.276+05	1.251+05	9.426-01	1.212+00
4.000+03	1.293-03	1.565+01	5.047+10	1.864+00	7.574+00	.00000	3.060+11	5.376+06	1.205+05	9.488-01	1.243+00
4.000+03	1.293-02	1.502+02	4.373+10	1.942+00	7.178+00	.00000	2.192+11	2.364+07	1.187+05	9.522-01	1.269+00
4.000+03	1.293-01	1.477+03	4.109+10	1.974+00	6.781+00	.00000	1.738+11	8.287+07	1.184+05	9.535-01	1.282+00
4.000+03	1.293+00	1.469+04	4.020+10	1.985+00	6.384+00	.00000	1.572+11	2.706+08	1.185+05	9.539-01	1.286+00
4.500+03	1.293-10	3.239-06	3.200+11	1.013+00	1.082+01	.00021	6.207+11	1.039+00	1.723+05	1.842+00	1.079+00
4.500+03	1.293-09	2.999-05	2.730+11	1.094+00	1.037+01	.00007	2.387+12	4.584+01	1.607+05	-3.992-01	1.086+00
4.500+03	1.293-08	2.516-04	1.786+11	1.304+00	9.923+00	.00002	2.566+12	4.933+02	1.468+05	8.228-01	1.110+00
4.500+03	1.293-07	2.190-03	1.148+11	1.498+00	9.477+00	.00001	1.254+12	2.296+03	1.377+05	9.028-01	1.149+00
4.500+03	1.293-06	2.056-02	8.893+10	1.596+00	9.031+00	.00000	5.226+11	8.342+03	1.355+05	9.198-01	1.181+00
4.500+03	1.293-05	2.000-01	7.938+10	1.641+00	8.584+00	.00000	2.646+11	3.504+04	1.372+05	9.256-01	1.197+00
4.500+03	1.293-04	1.944+00	7.322+10	1.688+00	8.138+00	.00000	2.365+11	4.214+05	1.367+05	9.297-01	1.208+00
4.500+03	1.293-03	1.836+01	6.321+10	1.788+00	7.691+00	.00000	2.896+11	6.469+06	1.316+05	9.365-01	1.228+00
4.500+03	1.293-02	1.729+02	5.335+10	1.898+00	7.245+00	.00000	2.423+11	4.113+07	1.275+05	9.427-01	1.254+00
4.500+03	1.293-01	1.677+03	4.847+10	1.957+00	6.799+00	.00000	1.870+11	1.633+08	1.261+05	9.456-01	1.271+00
4.500+03	1.293+00	1.658+04	4.668+10	1.979+00	6.352+00	.00000	1.626+11	5.544+08	1.257+05	9.466-01	1.278+00
5.000+03	1.293-10	3.647-06	3.332+11	1.001+00	1.128+01	.00135	1.893+11	1.798-01	1.900+05	1.660+00	1.006+00
5.000+03	1.293-09	3.607-05	3.260+11	1.011+00	1.079+01	.00043	4.638+11	8.904+00	1.840+05	1.704+00	1.007+00
5.000+03	1.293-08	3.370-04	2.841+11	1.082+00	1.029+01	.00014	1.819+12	4.260+02	1.716+05	-3.545+00	1.093+00

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASQ	EGAM	EGAM2/ GAMMA
5.000+03	1.293-07	2.838-03	1.907+11	1.285+00	9.793+00	.00004	2.167+12	5.115+03	1.567+05	7.758-01	1.117+00
5.000+03	1.293-06	2.452-02	1.231+11	1.487+00	9.297+00	.00001	1.109+12	2.484+04	1.464+05	8.848-01	1.156+00
5.000+03	1.293-05	2.286-01	9.474+10	1.595+00	8.801+00	.00000	4.784+11	9.329+04	1.436+05	9.082-01	1.189+00
5.000+03	1.293-04	2.206+00	[illegible].347+10	1.653+00	8.305+00	.00000	2.628+11	4.652+05	1.445+05	9.163-01	1.207+00
5.000+03	1.293-03	2.106+01	[illegible].454+10	1.730+00	7.809+00	.00000	2.514+11	5.917+06	1.421+05	9.233-01	1.222+00
5.000+03	1.293-02	1.975+02	6.358+10	1.846+00	7.313+00	.00000	2.469+11	5.556+07	1.369+05	9.316-01	1.243+00
5.000+03	1.293-01	1.086+03	5.632+10	1.933+00	6.817+00	.00000	1.969+11	2.652+08	1.339+05	9.367-01	1.262+00
5.000+03	1.293+00	1.850+04	5.332+10	1.971+00	6.321+00	.00000	1.667+11	9.569+08	1.329+05	9.387-01	1.272+00
5.500+03	1.293-10	4.035-06	3.429+11	1.000+00	1.175+01	.00627	3.022+11	4.041-01	1.999+05	1.597+00	1.092+00
5.500+03	1.293-09	4.013-05	3.379+11	1.002+00	1.120+01	.00199	2.041+11	2.490+00	2.071+05	1.655+00	1.093+00
5.500+03	1.293-08	3.956-04	3.285+11	1.014+00	1.066+01	.00063	4.814+11	1.129+02	1.936+05	1.804+00	1.094+00
5.500+03	1.293-07	3.649-03	2.793+11	1.099+00	1.0[illegible]-01	.00020	1.659+12	4.686+03	1.793+05	-1.710+00	1.102+00
5.500+03	1.293-06	3.056-02	1.851+11	1.312+00	9.565+00	.00006	1.713+12	4.840+04	1.635+05	7.716-01	1.129+00
5.500+03	1.293-05	2.662-01	1.229+11	1.506+00	9.020+00	.00002	8.493+11	2.239+05	1.537+05	8.751-01	1.170+00
5.500+03	1.293-04	2.469+00	9.708+10	1.612+00	8.474+00	.00001	3.875+11	8.844+05	1.512+05	8.989-01	1.201+00
5.500+03	1.293-03	2.376+01	8.502+10	1.688+00	7.928+00	.00000	2.528+11	5.989+06	1.507+05	9.091-01	1.219+00
5.500+03	1.293-02	2.231+02	7.374+10	1.798+00	7.383+00	.00000	2.404+11	6.356+07	1.462+05	9.191-01	1.237+00
5.500+03	1.293-01	2.106+03	6.450+10	1.904+00	6.837+00	.00000	2.026+11	3.738+00	1.418+05	9.268-01	1.256+00
5.500+03	1.293+00	2.047+04	6.009+10	1.959+00	6.291+00	.00000	1.697+11	1.461+09	1.399+05	9.302-01	1.267+00
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	.00000	0.000	0.000	0.000	0.000	0.000

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASO	EGAM	EGAM2/ GAMMA
6.000+03	1.293-10	4.474-06	3.632+11	1.000+00	1.223+01	.02249	6.987+11	1.395+00	2.012+05	1.478+00	1.097+00
6.000+03	1.293-09	4.406-05	3.481+11	1.000+00	1.162+01	.00722	3.006+11	4.766+00	2.093+05	1.593+00	1.099+00
6.000+03	1.293-08	4.373-04	3.417+11	1.003+00	1.103+01	.00229	2.243+11	3.698+01	2.145+05	1.662+00	1.100+00
6.000+03	1.293-07	4.270-03	3.262+11	1.025+00	1.043+01	.00073	6.185+11	1.839+03	1.995+05	1.922+00	1.103+00
6.000+03	1.293-06	3.816-02	2.599+11	1.147+00	9.834+00	.00023	1.601+12	5.379+04	1.840+05	2.243-03	1.115+00
6.000+03	1.293-05	3.186-01	1.685+11	1.374+00	9.239+00	.00007	1.254+12	4.125+05	1.680+05	7.944-01	1.148+00
6.000+03	1.293-04	2.829+00	1.179+11	1.547+00	8.644+00	.00002	5.928+11	1.767+06	1.599+05	8.711-01	1.188+00
6.000+03	1.293-03	2.654+01	9.673+10	1.649+00	8.049+00	.00001	3.057+11	8.191+06	1.579+05	8.923-01	1.215+00
6.000+03	1.293-02	2.493+02	8.372+10	1.755+00	7.453+00	.00000	2.393+11	6.949+07	1.548+05	9.052-01	1.233+00
6.000+03	1.293-01	2.336+03	7.288+10	1.873+00	6.858+00	.00000	2.059+11	4.782+08	1.498+05	9.157-01	1.251+00
6.000+03	1.293+00	2.249+04	6.698+10	1.946+00	6.263+00	.00000	1.722+11	2.045+09	1.469+05	9.210-01	1.263+00
6.500+03	1.293-10	5.048-06	4.097+11	1.000+00	1.272+01	.06508	1.549+12	3.921+00	2.099+05	1.330+00	1.097+00
6.500+03	1.293-09	4.841-05	3.665+11	1.000+00	1.205+01	.02143	5.945+11	1.345+01	2.111+05	1.495+00	1.103+00
6.500+03	1.293-08	4.769-04	3.518+11	1.001+00	1.140+01	.00687	2.726+11	4.895+01	2.198+05	1.604+00	1.106+00
6.500+03	1.293-07	4.719-03	3.435+11	1.007+00	1.075+01	.00218	2.732+11	6.570+02	2.197+05	1.690+00	1.108+00
6.500+03	1.293-06	4.501-02	3.137+11	1.054+00	1.011+01	.00069	8.805+11	3.276+04	2.031+05	2.481+00	1.112+00
5.500+03	1.293-05	3.854-01	2.271+11	1.230+00	9.460+00	.00022	1.403+12	5.488+05	1.855+05	5.188-01	1.133+00
6.500+03	1.293-04	3.261+00	1.486+11	1.454+00	8.815+00	.00007	8.357+11	3.096+06	1.713+05	8.191-01	1.172+00
6.500+03	1.293-03	2.960+01	1.117+11	1.601+00	8.170+00	.00002	4.011+11	1.314+07	1.656+05	8.698-01	1.208+00
6.500+03	1.293-02	2.762+02	9.404+10	1.716+00	7.525+00	.00001	2.547+11	8.106+07	1.626+05	8.895-01	1.230+00
6.500+03	1.293-01	2.574+03	8.142+10	1.841+00	6.881+00	.00000	2.094+11	5.795+08	1.575+05	9.032-01	1.248+00
6.500+03	1.293+00	2.455+04	7.398+10	1.930+00	6.236+00	.00000	1.745+11	2.693+09	1.537+05	9.109-01	1.260+00
7.000+03	1.293-10	5.900-06	5.048+11	1.000+00	1.324+01	.15576	2.948+12	8.827+00	2.255+05	1.215+00	1.092+00
7.000+03	1.293-09	5.379-05	4.032+11	1.000+00	1.249+01	.05390	1.160+12	3.309+01	2.184+05	1.372+00	1.105+00
7.000+03	1.293-08	5.193-04	3.671+11	1.000+00	1.177+01	.01759	4.581+11	1.127+02	2.218+05	1.527+00	1.111+00
7.000+03	1.293-07	5.123-03	3.541+11	1.002+00	1.107+01	.00562	2.466+11	5.182+02	2.304+05	1.625+00	1.113+00
7.000+03	1.293-06	5.021-02	3.400+11	1.019+00	1.038+01	.00178	4.116+11	1.469+04	2.214+05	1.785+00	1.116+00
7.000+03	1.293-05	4.563-01	2.830+11	1.119+00	9.682+00	.00056	1.131+12	5.044+05	2.037+05	-4.173+00	1.126+00
7.000+03	1.293-04	3.802+00	1.891+11	1.343+00	8.988+00	.00018	1.029+12	4.546+06	1.853+05	7.043-01	1.157+00
7.000+03	1.293-03	3.315+01	1.315+11	1.540+00	8.293+00	.00006	5.235+11	2.097+07	1.745+05	8.360-01	1.198+00
7.000+03	1.293-02	3.044+02	1.055+11	1.677+00	7.599+00	.00002	2.886+11	1.043+08	1.700+05	8.707-01	1.226+00
7.000+03	1.293-01	2.820+03	9.021+10	1.810+00	6.905+00	.00001	2.161+11	6.908+08	1.649+05	8.893-01	1.245+00
7.000+03	1.293+00	2.667+04	8.110+10	1.914+00	6.210+00	.00000	1.774+11	3.407+09	1.604+05	8.999-01	1.258+00
7.500+03	1.293-10	7.128-06	6.593+11	1.000+00	1.382+01	.30328	4.003+12	1.352+01	2.479+05	1.151+00	1.085+00
7.500+03	1.293-09	6.110-05	4.713+11	1.000+00	1.294+01	.11729	2.052+12	6.920+01	2.310+05	1.264+00	1.102+00
7.500+03	1.293-08	5.685-04	3.935+11	1.000+00	1.216+01	.03956	7.953+11	2.479+02	2.272+05	1.430+00	1.113+00
7.500+03	1.293-07	5.535-03	3.664+11	1.001+00	1.140+01	.01278	3.382+11	8.720+02	2.336+05	1.567+00	1.118+00
7.500+03	1.293-06	5.454-02	3.539+11	1.007+00	1.065+01	.00407	2.665+11	7.920+03	2.372+05	1.668+00	1.121+00
7.500+03	1.293-05	5.169-01	3.223+11	1.055+00	9.907+00	.00129	7.011+11	3.356+05	2.207+05	2.256+00	1.126+00
7.500+03	1.293-04	4.431+00	2.350+11	1.235+00	9.162+00	.00041	1.072+12	5.479+06	2.010+05	3.670-01	1.148+00
7.500+03	1.293-03	3.733+01	1.567+11	1.465+00	8.418+00	.00013	6.498+11	3.108+07	1.851+05	7.803-01	1.187+00
7.500+03	1.293-02	3.347+02	1.187+11	1.634+00	7.674+00	.00004	3.374+11	1.422+08	1.776+05	8.467-01	1.221+00
7.500+03	1.293-01	3.075+03	9.942+10	1.779+00	6.930+00	.00001	2.275+11	8.309+08	1.721+05	8.735-01	1.242+00
7.500+03	1.293+00	2.884+04	8.838+10	1.896+00	6.186+00	.00000	1.812+11	4.205+09	1.669+05	8.878-01	1.256+00
8.000+03	1.293-10	8.697-06	8.584+11	1.000+00	1.447+01	.49084	5.007+12	1.918+01	2.742+05	1.120+00	1.079+00
8.000+03	1.293-09	7.138-05	5.836+11	1.000+00	1.343+01	.22357	3.181+12	1.229+02	2.491+05	1.190+00	1.096+00
8.000+03	1.293-08	6.296-04	4.382+11	1.000+00	1.255+01	.07955	1.312+12	4.870+02	2.367+05	1.333+00	1.113+00
8.000+03	1.293-07	5.985-03	3.845+11	1.000+00	1.173+01	.02623	5.168+11	1.690+03	2.375+05	1.496+00	1.122+00
8.600+03	1.293-06	5.867-02	3.650+11	1.003+00	1.093+01	.00841	2.678+11	7.614+03	2.454+05	1.612+00	1.126+00
8.000+03	1.293-05	5.706-01	3.456+11	1.025+00	1.013+01	.00267	4.145+11	1.932+05	2.369+05	1.802+00	1.129+00
8.000+03	1.293-04	5.069+00	2.789+11	1.147+00	9.338+00	.00085	9.377+11	5.377+05	2.171+05	-2.620+00	1.143+00

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASO	EGAM	EGAM2/ GAMMA
8.000+03	1.293-03	4.221+01	1.870+11	1.382+00	8.544+00	.00027	7.506+11	4.185+07	1.972+05	6.785-01	1.177+00
8.000+03	1.293-02	3.680+02	1.344+11	1.585+00	7.750+00	.00008	3.951+11	1.950+08	1.859+05	8.146-01	1.215+00
8.000+03	1.293-01	3.340+03	1.093+11	1.747+00	6.957+00	.00003	2.439+11	1.017+09	1.791+05	8.551-01	1.240+00
8.000+03	1.293+00	3.107+04	9.588+10	1.877+00	6.163+00	.00001	1.864+11	5.116+09	1.732+05	8.745-01	1.254+00
8.500+03	1.293-10	9.664-06	9.370+11	1.000+00	1.535+01	.55910	1.591+12	6.049+00	2.942+05	1.117+00	1.081+00
8.500+03	1.293-09	8.439-05	7.308+11	1.000+00	1.398+01	.36156	3.738+12	1.601+02	2.711+05	1.150+00	1.090+00
8.500+03	1.293-08	7.095-04	5.089+11	1.000+00	1.297+01	.14474	1.995+12	8.521+02	2.501+05	1.254+00	1.109+00
8.500+03	1.293-07	6.503-03	4.122+11	1.000+00	1.207+01	.04924	7.874+11	3.111+03	2.440+05	1.417+00	1.124+00
8.500+03	1.293-06	6.289-02	3.779+11	1.001+00	1.121+01	.01596	3.404+11	1.128+04	2.497+05	1.560+00	1.130+00
8.500+03	1.293-05	6.157-01	3.604+11	1.012+00	1.036+01	.00509	2.945+11	1.224+05	2.511+05	1.684+00	1.134+00
8.500+03	1.293-04	5.712+00	3.145+11	1.087+00	9.515+00	.00161	7.090+11	4.395+06	2.325+05	2.823+00	1.142+00
8.500+03	1.293-03	4.772+01	2.206+11	1.300+00	8.671+00	.00051	7.985+11	5.081+07	2.105+05	4.607-01	1.170+00
8.500+03	1.293-02	4.050+02	1.525+11	1.531+00	7.828+00	.00016	4.543+11	2.605+08	1.949+05	7.689-01	1.208+00
8.500+03	1.293-01	3.619+03	1.199+11	1.713+00	6.985+00	.00005	2.646+11	1.262+09	1.862+05	8.332-01	1.236+00
8.500+03	1.293+00	3.336+04	1.037+11	1.858+00	6.141+00	.00002	1.929+11	6.177+09	1.794+05	8.596-01	1.252+00
9.000+03	1.293-10	1.060-05	1.007+12	1.000+00	1.625+01	.61533	1.657+12	6.686+00	3.081+05	1.116+00	1.083+00
9.000+03	1.293-09	9.923-05	8.931+11	1.000+00	1.460+01	.51196	1.372+12	6.019+01	3.000+05	1.129+00	1.087+00
9.000+03	1.293-08	8.139-04	6.113+11	1.000+00	1.340+01	.24014	2.759+12	1.327+03	2.575+05	1.198+00	1.104+00
9.000+03	1.293-07	7.124-03	4.537+11	1.000+00	1.242+01	.08555	1.153+12	5.295+03	2.534+05	1.341+00	1.123+00
9.000+03	1.293-06	6.744-02	3.951+11	1.001+00	1.149+01	.02820	4.651+11	1.861+04	2.542+05	1.502+00	1.134+00
9.000+03	1.293-05	6.583-01	3.724+11	1.006+00	1.059+01	.00904	2.723+11	1.051+05	2.607+05	1.625+00	1.139+00
9.000+03	1.293-04	6.269+00	3.403+11	1.050+00	9.694+00	.00287	5.015+11	3.193+06	2.472+05	1.975+00	1.144+00
9.000+03	1.293-03	5.364+01	2.548+11	1.225+00	8.800+00	.00091	7.804+11	5.555+07	2.244+05	-1.970-01	1.165+00
9.000+03	1.293-02	4.460+02	1.732+11	1.472+00	7.907+00	.00029	5.073+11	3.336+08	2.048+05	7.005-01	1.202+00
9.000+03	1.293-01	3.913+03	1.316+11	1.677+00	7.014+00	.00009	2.880+11	1.568+09	1.934+05	8.063-01	1.233+00
9.000+03	1.293+00	3.572+04	1.118+11	1.838+00	6.121+00	.00003	2.009+11	7.418+09	1.856+05	8.429-01	1.250+00
9.500+03	1.293-10	1.158-05	1.080+12	1.000+00	1.714+01	.67124	1.749+12	7.465+00	3.218+05	1.115+00	1.084+00
9.500+03	1.293-09	1.082-04	9.541+11	1.000+00	1.540+01	.56249	1.455+12	6.766+01	3.131+05	1.128+00	1.089+00
9.500+03	1.293-08	9.390-04	7.362+11	1.000+00	1.389+01	.35552	3.037+12	1.598+03	2.877+05	1.165+00	1.100+00
9.500+03	1.293-07	7.888-03	5.127+11	1.000+00	1.278+01	.13865	1.598+12	8.326+03	2.656+05	1.277+00	1.121+00
9.500+03	1.293-06	7.250-02	4.187+11	1.000+00	1.178+01	.04682	6.385+11	3.016+04	2.605+05	1.441+00	1.136+00
9.500+03	1.293-05	7.010-01	3.846+11	1.003+00	1.082+01	.01513	3.034+11	1.238+05	2.667+05	1.580+00	1.143+00
9.500+03	1.293-04	6.765+00	3.587+11	1.029+00	9.875+00	.00482	3.677+11	2.267+06	2.609+05	1.770+00	1.148+00
9.500+03	1.293-03	5.967+01	2.869+11	1.163+00	8.931+00	.00153	7.049+11	5.500+07	2.383+05	-1.471+01	1.163+00
9.500+03	1.293-02	4.910+02	1.959+11	1.412+00	7.988+00	.00048	5.472+11	4.072+08	2.154+05	5.907-01	1.196+00
9.500+03	1.293-01	4.226+03	1.443+11	1.640+00	7.045+00	.00015	3.124+11	1.934+09	2.009+05	7.725-01	1.229+00
9.500+03	1.293+00	3.815+04	1.203+11	1.816+00	6.102+00	.00005	2.099+11	8.861+09	1.916+05	8.238-01	1.249+00
1.000+04	1.293-10	1.260-05	1.158+12	1.010+12	1.804+01	.72727	1.841+12	8.287+00	3.355+05	1.114+00	1.085+00
1.000+04	1.293-09	1.176-04	1.018+12	1.000+00	1.621+01	.61287	1.510+12	7.405+01	3.264+05	1.127+00	1.091+00
1.000+04	1.293-08	1.061-03	8.757+11	1.000+00	1.443+01	.48300	3.361+12	1.950+03	3.093+05	1.145+00	1.097+00
1.000+04	1.293-07	8.829-03	5.920+11	1.000+00	1.316+01	.21084	2.083+12	1.210+04	2.807+05	1.229+00	1.117+00
1.000+04	1.293-06	7.828-02	4.508+11	1.000+00	1.208+01	.07362	8.582+11	4.662+04	2.686+05	1.381+00	1.136+00
1.000+04	1.293-05	7.454-01	3.990+11	1.002+00	1.106+01	.02407	3.686+11	1.712+05	2.717+05	1.535+00	1.146+00
1.000+04	1.293-04	7.224+00	3.730+11	1.017+00	1.006+01	.00770	3.022+11	1.742+06	2.727+05	1.681+00	1.152+00
1.000+04	1.293-03	6.556+01	3.150+11	1.115+00	9.062+00	.00244	5.987+11	5.001+07	2.520+05	3.043+00	1.163+00
1.000+04	1.293-02	5.398+02	2.199+11	1.352+00	8.070+00	.00077	5.691+11	4.730+08	2.266+05	3.954-01	1.192+00
1.000+04	1.293-01	4.559+03	1.581+11	1.600+00	7.077+00	.00024	3.362+11	2.348+09	2.008+05	7.289-01	1.226+00
1.000+04	1.293+00	4.065+04	1.292+11	1.794+00	6.085+00	.00008	2.198+11	1.051+10	1.977+05	8.017-01	1.247+00
1.050+04	1.293-10	1.365-05	1.239+12	1.078+12	1.894+01	.78340	1.933+12	9.152+00	3.492+05	1.113+00	1.086+00
1.050+04	1.293-09	1.273-04	1.085+12	1.000+00	1.701+01	.66303	1.585+12	8.101+01	3.394+05	1.126+00	1.092+00
1.050+04	1.293-08	1.182-03	9.469+11	1.000+00	1.511+01	.54388	1.289+12	7.293+02	3.295+05	1.141+00	1.090+00

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASQ	EGAM	EGAM2/ GAMMA
1.050+04	1.293-07	9.968-03	6.916+11	1.000+00	1.356+01	.30186	2.532+12	1.623+04	2.983+05	1.194+00	1.113+00
1.050+04	1.293-06	8.500-02	4.932+11	1.000+00	1.238+01	.11021	1.117+12	6.842+04	2.787+05	1.328+00	1.135+00
1.050+04	1.293-05	7.929-01	4.168+11	1.001+00	1.130+01	.03662	4.603+11	2.467+05	2.772+05	1.490+00	1.149+00
1.050+04	1.293-04	7.666+00	3.855+11	1.011+00	1.024+01	.01177	2.839+11	1.564+06	2.818+05	1.629+00	1.156+00
1.050+04	1.293-03	7.113+01	3.385+11	1.081+00	9.196+00	.00374	4.919+11	4.280+07	2.651+05	2.147+00	1.165+00
1.050+04	1.293-02	5.914+02	2.445+11	1.297+00	8.153+00	.00118	5.711+11	5.237+08	2.383+05	-2.103-02	1.190+00
1.050+04	1.293-01	4.914+03	1.729+11	1.559+00	7.111+00	.00037	3.576+11	2.796+09	2.170+05	6.709-01	1.223+00
1.050+04	1.293+00	4.325+04	1.386+11	1.771+00	6.069+00	.00012	2.302+11	1.237+10	2.037+05	7.760-01	1.245+00
1.100+04	1.293-10	1.476-05	1.324+12	1.151+12	1.985+01	.83961	2.025+12	1.006+01	3.629+05	1.112+00	1.087+00
1.100+04	1.293-09	1.374-04	1.154+12	1.000+00	1.782+01	.71330	1.660+12	8.996+01	3.525+05	1.125+00	1.093+00
1.100+04	1.293-08	1.274-03	1.004+12	1.000+00	1.582+01	.58869	1.335+12	7.932+02	3.421+05	1.140+00	1.099+00
1.100+04	1.293-07	1.121-02	7.975+11	1.000+00	1.401+01	.39696	2.563+12	1.767+04	3.169+05	1.173+00	1.110+00
1.100+04	1.293-06	9.286-02	5.474+11	1.000+00	1.270+01	.15778	1.402+12	9.537+04	2.906+05	1.283+00	1.133+00
1.100+04	1.293-05	8.445-01	4.390+11	1.001+00	1.154+01	.05354	5.749+11	3.516+05	2.837+05	1.444+00	1.151+00
1.100+04	1.293-04	8.105+00	3.979+11	1.007+00	1.043+01	.01733	2.961+11	1.659+06	2.887+05	1.588+00	1.160+00
1.100+04	1.293-03	7.636+01	3.577+11	1.057+00	9.331+00	.00552	4.044+11	3.558+07	2.774+05	1.883+00	1.167+00
1.100+04	1.293-02	6.456+02	2.688+11	1.246+00	8.238+00	.00175	5.544+11	5.542+08	2.501+05	-1.391+00	1.188+00
1.100+04	1.293-01	5.290+03	1.885+11	1.518+00	7.146+00	.00055	3.753+11	3.259+09	2.255+05	5.910-01	1.220+00
1.100+04	1.293+00	4.594+04	1.485+11	1.747+00	6.054+00	.00018	2.405+11	1.442+10	2.099+05	7.455-01	1.242+00

CMOL RESULTS

The following output illustrates CMOL/EIONX answers for a portion of the molecular checkout set (TRAIL = 6.) done by GOLEM. The column captions refer to:

COLUMN	NAME	UNITS	MEANING
1	THETA	^oK	temperature; ordinarily given in eV (1 eV = 11605.4 ^oK)
2	RHO	gm/cc	density, ρ
3	P1	dynes/cm^2	pressure
4	E	ergs/gm	specific internal energy; includes $E_o \simeq 6 \times 10^{11}$ ergs/gm
5	NBAR EIONIZ	 ergs/gm	NBAR, the mean no. of atoms/molecule, is printed when NBAR $\neq$ 1. EIONIZ is printed when NBAR = 1. EIONIZ is the ionization contribution to the specific internal energy
6	SYNPOT		$\theta_{eV}\ \ell n\ \Gamma\ \ [\Gamma \simeq 0.01\ A\ \theta^{3/2}/(\rho\bar{Z})]$ where A is the mean atomic weight. ($A \simeq 12.$ for CMOL)
7	FEW		FEW = ZBAR = $\bar{Z}$, the mean ion charge
8	CV	ergs/gm/eV	$CV \equiv \left(\frac{\partial E}{\partial \theta}\right)_\rho$; θ in eV
9	PB1	ergs/cc	$PB1 \equiv \left(\frac{\partial E}{\partial \tau}\right)_\theta$; $\tau = 1/\rho$
10	ASQ	cm/sec	equilibrium sound speed
11	EGAM		$1 + \frac{P}{\rho(E-E_o)}$; $E_o \simeq 6 \times 10^{11}$ ergs/gm for CMOL
12	EGAM2		$1 + \frac{P}{\rho E}$

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASO	EGAW	EGAM2/ GAMMA
5.000+02	1.000-10	3.795-08	1.351+11	9.000+00	7.275-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-09	3.795-07	1.351+11	9.000+00	6.283-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-08	3.795-06	1.351+11	9.000+00	5.291-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-07	3.795-05	1.351+11	9.000+00	4.299-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-06	3.795-04	1.351+11	9.000+00	3.307-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-05	3.795-03	1.351+11	9.000+00	2.315-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-04	3.795-02	1.351+11	9.000+00	1.323-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-03	3.795-01	1.351+11	9.000+00	3.305-02	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-02	3.795+00	1.351+11	9.000+00	-6.615-02	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000-01	3.795+01	1.351+11	9.000+00	-1.654-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000+00	3.795+02	1.351+11	9.000+00	-2.646-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
5.000+02	1.000+01	3.795+03	1.351+11	9.000+00	-3.638-01	.00000	1.492+11	0.000	2.019+04	9.992-01	1.003+00
1.000+03	1.000-10	7.590-08	1.421+11	9.000+00	1.545+00	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-09	7.590-07	1.421+11	9.000+00	1.346+00	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-08	7.590-06	1.421+11	9.000+00	1.148+00	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-07	7.590-05	1.421+11	9.000+00	9.493-01	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-06	7.590-04	1.421+11	9.000+00	7.509-01	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-05	7.590-03	1.421+11	9.000+00	5.525-01	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-04	7.590-02	1.421+11	9.000+00	3.541-01	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-03	7.590-01	1.421+11	9.000+00	1.557-01	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-02	7.590+00	1.421+11	9.000+00	-4.271-02	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000-01	7.590+01	1.421+11	9.000+00	-2.411-01	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000+00	7.590+02	1.421+11	9.000+00	-4.395-01	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.000+03	1.000+01	7.590+03	1.421+11	9.000+00	-6.379-01	.00000	1.735+11	0.000	2.844+04	9.983-01	1.005+00
1.500+03	1.000-10	1.139-07	1.500+11	9.000+00	6.781+00	.00000	1.919+11	4.225-14	3.475+04	9.974-01	1.008+00
1.500+03	1.000-09	1.139-06	1.500+11	9.000+00	6.632+00	.00000	1.919+11	1.336-13	3.475+04	9.974-01	1.008+00
1.500+03	1.000-08	1.139-05	1.500+11	9.000+00	6.483+00	.00000	1.919+11	4.225-13	3.475+04	9.974-01	1.008+00
1.500+03	1.000-07	1.139-04	1.500+11	9.000+00	6.335+00	.00000	1.919+11	1.336-12	3.475+04	9.974-01	1.008+00
1.500+03	1.000-06	1.139-03	1.500+11	9.000+00	6.186+00	.00000	1.920+11	4.225-12	3.475+04	9.974-01	1.008+00
1.500+03	1.000-05	1.139-02	1.500+11	9.000+00	6.037+00	.00000	1.919+11	1.336-11	3.475+04	9.974-01	1.008+00
1.500+03	1.000-04	1.139-01	1.500+11	9.000+00	6.098-01	.00000	1.919+11	0.000	3.475+04	9.974-01	1.008+00
1.500+03	1.000-03	1.139+00	1.500+11	9.000+00	3.122-01	.00000	1.919+11	0.000	3.475+04	9.974-01	1.008+00
1.500+03	1.000-02	1.139+01	1.500+11	9.000+00	1.454-02	.00000	1.920+11	0.000	3.475+04	9.974-01	1.008+00
1.500+03	1.000-01	1.139+02	1.500+11	9.000+00	-2.831-01	.00000	1.919+11	0.000	3.475+04	9.974-01	1.008+00
1.500+03	1.000+00	1.139+03	1.500+11	9.000+00	-5.807-01	.00000	1.919+11	0.000	3.475+04	9.974-01	1.008+00
1.500+03	1.000+01	1.139+04	1.500+11	9.000+00	-8.783-01	.00000	1.919+11	0.000	3.475+04	9.974-01	1.008+00
2.000+03	1.000-10	4.476-07	2.406+11	3.052+00	7.202+00	.00000	4.870+11	1.948-01	7.046+04	9.873-01	1.019+00
2.000+03	1.000-09	4.046-06	2.289+11	3.377+00	7.004+00	.00000	1.780+12	1.028+01	6.626+04	9.889-01	1.018+00
2.000+03	1.000-08	2.841-05	1.958+11	4.809+00	6.806+00	.00000	2.471+12	1.438+02	5.524+04	9.929-01	1.015+00
2.000+03	1.000-07	2.008-04	1.726+11	6.803+00	6.607+00	.00000	1.180+12	6.090+02	4.626+04	9.952-01	1.012+00
2.000+03	1.000-06	1.704-03	1.640+11	8.018+00	6.409+00	.00000	5.425+11	2.078+03	4.251+04	9.960-01	1.011+00
2.000+03	1.000-05	1.600-02	1.610+11	8.541+00	6.210+00	.00000	3.316+11	7.690+03	4.115+04	9.963-01	1.010+00
2.000+03	1.000-04	1.559-01	1.598+11	8.765+00	6.012+00	.00000	2.603+11	3.323+04	4.061+04	9.964-01	1.010+00
2.000+03	1.000-03	1.540+00	1.593+11	8.871+00	5.814+00	.00000	2.325+11	1.638+05	4.036+04	9.964-01	1.010+00
2.000+03	1.000-02	1.530+01	1.590+11	8.928+00	5.615+00	.00000	2.199+11	8.674+05	4.023+04	9.965-01	1.010+00
2.000+03	1.000-01	1.525+02	1.588+11	8.961+00	5.417+00	.00000	2.137+11	4.658+06	4.015+04	9.965-01	1.010+00
2.000+03	1.000+00	1.521+03	1.588+11	8.980+00	5.218+00	.00000	2.104+11	2.363+07	4.010+04	9.965-01	1.010+00
2.000+03	1.000+01	1.519+04	1.587+11	8.993+00	5.020+00	.00006	2.089+11	9.339+07	4.006+04	9.965-01	1.010+00
2.500+03	1.000-10	7.222-07	3.012+11	2.365+00	7.632+00	.00000	4.654+12	2.962+00	8.812+04	9.754-01	1.024+00
2.500+03	1.000-09	6.073-06	2.632+11	2.812+00	7.384+00	.00000	1.399+12	7.962+00	8.106+04	9.817-01	1.023+00
2.500+03	1.000-08	5.725-05	2.522+11	2.983+00	7.136+00	.00000	6.051+11	3.112+01	7.936+04	9.833-01	1.023+00

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASQ	EGAM	EGAM2/ GAMMA
2.500+03	1.000-07	5.334-04	2.430+11	3.202+00	6.888+00	.00000	8.523+11	6.558+02	7.667+04	9.848-01	1.022+00
2.500+03	1.000-06	4.095-03	2.162+11	4.170+00	6.640+00	.00000	1.692+12	1.501+04	6.675+04	9.891-01	1.019+00
2.500+03	1.000-05	2.798-02	1.878+11	6.103+00	6.392+00	.00000	1.065+12	8.474+04	5.480+04	9.931-01	1.015+00
2.500+03	1.000-04	2.239-01	1.754+11	7.626+00	6.144+00	.00000	5.294+11	3.086+05	4.879+04	9.946-01	1.013+00
2.500+03	1.000-03	2.042+00	1.710+11	8.363+00	5.896+00	.00000	3.313+11	1.131+06	4.650+04	9.952-01	1.012+00
2.500+03	1.000-02	1.966+01	1.693+11	8.684+00	5.648+00	.00000	2.633+11	4.690+06	4.559+04	9.954-01	1.012+00
2.500+03	1.000-01	1.933+02	1.685+11	8.837+00	5.400+00	.00000	2.376+11	2.176+07	4.517+04	9.954-01	1.012+00
2.500+03	1.000+00	1.915+03	1.682+11	8.918+00	5.152+00	.00000	2.267+11	1.046+08	4.495+04	9.955-01	1.012+00
2.500+03	1.000+01	1.905+04	1.680+11	8.967+00	4.904+00	.00000	2.218+11	4.495+08	4.481+04	9.955-01	1.011+00
3.000+03	1.000-10	1.996-06	6.103+11	1.027+00	8.068+00	.00000	1.590+12	1.522+00	1.506+05	2.731+00	1.033+00
3.000+03	1.000-09	1.547-05	4.932+11	1.325+00	7.771+00	.00000	8.591+12	8.316+01	1.299+05	8.512-01	1.032+00
3.000+03	1.000-08	9.705-05	3.384+11	2.112+00	7.473+00	.00000	4.656+12	4.274+02	1.027+05	9.622-01	1.029+00
3.000+03	1.000-07	7.596-04	2.804+11	2.698+00	7.175+00	.00000	1.578+12	1.307+03	9.094+04	9.758-01	1.027+00
3.000+03	1.000-06	6.849-03	2.611+11	2.992+00	6.878+00	.00000	7.510+11	6.120+03	8.683+04	9.794-01	1.027+00
3.000+03	1.000-05	5.868-02	2.423+11	3.492+00	6.580+00	.00000	1.041+12	1.198+05	8.041+04	9.833-01	1.025+00
3.000+03	1.000-04	4.104-01	2.106+11	4.994+00	6.283+00	.00000	1.080+12	1.255+06	6.673+04	9.893-01	1.020+00
3.000+03	1.000-03	2.990+00	1.903+11	6.853+00	5.985+00	.00000	5.989+11	5.431+06	5.650+04	9.926-01	1.016+00
3.000+03	1.000-02	2.563+01	1.825+11	7.996+00	5.687+00	.00000	3.611+11	1.989+07	5.209+04	9.938-01	1.014+00
3.000+03	1.000-01	2.404+02	1.795+11	8.525+00	5.390+00	.00000	2.761+11	7.762+07	5.037+04	9.942-01	1.014+00
3.000+03	1.000+00	2.336+03	1.783+11	8.773+00	5.092+00	.00000	2.452+11	3.312+08	4.961+04	9.944-01	1.013+00
3.000+03	1.000+01	2.302+04	1.778+11	8.903+00	4.795+00	.00000	2.329+11	1.406+09	4.922+04	9.945-01	1.013+00
3.500+03	1.000-10	2.389-06	6.286+11	1.001+00	8.510+00	.00011	1.631+11	4.153-02	1.911+05	1.805+00	1.039+00
3.500+03	1.000-09	2.373-05	6.252+11	1.008+00	8.163+00	.00004	3.921+11	3.849+00	1.744+05	1.902+00	1.038+00
3.500+03	1.000-08	2.198-04	5.881+11	1.088+00	7.815+00	.00001	2.994+12	4.023+02	1.572+05	-1.126+00	1.038+00
3.500+03	1.000-07	1.506-03	4.338+11	1.587+00	7.468+00	.00000	5.497+12	7.096+03	1.288+05	9.074-01	1.035+00
3.500+03	1.000-06	1.020-02	3.211+11	2.344+00	7.121+00	.00000	2.425+12	2.877+04	1.058+05	9.627-01	1.032+00
3.500+03	1.000-05	8.413-02	2.799+11	2.842+00	6.774+00	.00000	1.012+12	1.112+05	9.622+04	9.733-01	1.030+00
3.500+03	1.000-04	7.060-01	2.554+11	3.387+00	6.427+00	.00000	8.902+11	1.250+06	8.833+04	9.792-01	1.028+00
3.500+03	1.000-03	4.983+00	2.231+11	4.798+00	6.079+00	.00000	8.832+11	1.307+07	7.365+04	9.866-01	1.023+00
3.500+03	1.000-02	3.588+01	2.014+11	6.663+00	5.732+00	.00000	5.274+11	5.960+07	6.187+04	9.908-01	1.018+00
3.500+03	1.000-01	3.029+02	1.927+11	7.893+00	5.385+00	.00000	3.383+11	2.230+08	5.657+04	9.924-01	1.016+00
3.500+03	1.000+00	2.816+03	1.894+11	8.491+00	5.038+00	.00000	2.686+11	8.624+08	5.445+04	9.930-01	1.015+00
3.500+03	1.000+01	2.723+04	1.881+11	8.781+00	4.690+00	.00000	2.431+11	3.483+09	5.350+04	9.933-01	1.015+00
4.000+03	1.000-10	2.736-06	6.358+11	1.000+00	8.956+00	.00126	1.965+11	6.275-02	1.989+05	1.744+00	1.044+00
4.000+03	1.000-09	2.732-05	6.348+11	1.001+00	8.559+00	.00040	1.695+11	4.873-01	2.031+05	1.765+00	1.044+00
4.000+03	1.000-08	2.716-04	6.318+11	1.006+00	8.162+00	.00013	2.941+11	3.057+01	1.912+05	1.628+00	1.044+00
4.000+03	1.000-07	2.570-03	6.053+11	1.063+00	7.766+00	.00004	1.612+12	2.791+03	1.724+05	4.840+00	1.043+00
4.000+03	1.000-06	1.897-02	4.770+11	1.440+00	7.369+00	.00001	4.178+12	7.119+04	1.456+05	8.419-01	1.040+00
4.000+03	1.000-05	1.258-01	3.493+11	2.171+00	6.972+00	.00000	2.340+12	3.651+05	1.181+05	9.488-01	1.037+00
4.000+03	1.000-04	9.836-01	2.944+11	2.778+00	6.575+00	.00000	1.065+12	1.556+06	1.043+05	9.672-01	1.034+00
4.000+03	1.000-03	7.762+00	2.613+11	3.520+00	6.178+00	.00000	8.576+11	1.521+07	9.264+04	9.767-01	1.030+00
4.000+03	1.000-02	5.334+01	2.278+11	5.123+00	5.781+00	.00000	6.877+11	1.189+08	7.603+04	9.854-01	1.024+00
4.000+03	1.000-01	3.948+02	2.090+11	6.921+00	5.385+00	.00000	4.208+11	5.051+08	6.473+04	9.897-01	1.019+00
4.000+03	1.000+00	3.402+03	2.016+11	8.032+00	4.988+00	.00000	2.982+11	1.893+09	5.984+04	9.913-01	1.017+00
4.000+03	1.000+01	3.184+04	1.987+11	8.562+00	4.591+00	.00000	2.533+11	7.298+09	5.782+04	9.919-01	1.016+00
4.500+03	1.000-10	3.100-06	6.486+11	1.000+00	9.408+00	.00844	4.544+11	4.000-01	1.959+05	1.628+00	1.048+00
4.500+03	1.000-09	3.082-05	6.431+11	1.000+00	8.960+00	.00268	2.407+11	1.314+00	2.062+05	1.701+00	1.049+00
4.500+03	1.000-08	3.074-04	6.410+11	1.001+00	8.514+00	.00085	1.875+11	8.335+00	2.125+05	1.735+00	1.049+00
4.500+03	1.000-07	3.048-03	6.366+11	1.009+00	8.067+00	.00027	3.177+11	4.349+02	2.017+05	1.812+00	1.049+00
4.500+03	1.000-06	2.836-02	6.026+11	1.084+00	7.621+00	.00008	1.507+12	3.295+04	1.822+05	8.040+00	1.048+00
4.500+03	1.000-05	2.069-01	4.739+11	1.486+00	7.174+00	.00003	3.085+12	6.589+05	1.530+05	8.318-01	1.044+00

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPUT	FEW	CV	PB1	AS0	EGAM	EGAM2/ GAMMA
4.500+03	1.000-04	1.399+00	3.555+11	2.197+00	6.728+00	.00001	1.804+12	3.499+06	1.251+05	9.417-01	1.040+00
4.500+03	1.000-03	1.070+01	2.991+11	2.873+00	6.281+00	.00000	9.509+11	1.812+07	1.092+05	9.638-01	1.036+00
4.500+03	1.000-02	7.767+01	2.593+11	3.958+00	5.835+00	.00000	7.598+11	1.656+08	9.250+04	9.768-01	1.030+00
4.500+03	1.000-01	5.298+02	2.290+11	5.803+00	5.389+00	.00000	5.069+11	9.179+08	7.535+04	9.855-01	1.023+00
4.500+03	1.000+00	4.153+03	2.151+11	7.403+00	4.942+00	.00000	3.331+11	3.572+09	6.613+04	9.890-01	1.020+00
4.500+03	1.000+01	3.705+04	2.099+11	8.296+00	4.496+00	.00000	2.648+11	1.337+10	6.233+04	9.903-01	1.018+00
5.000+03	1.000-10	3.547-06	6.833+11	1.000+00	9.869+00	.03840	1.300+12	1.800+00	2.012+05	1.424+00	1.053+00
5.000+03	1.000-09	3.458-05	6.584+11	1.000+00	9.367+00	.01231	5.175+11	5.857+00	2.057+05	1.586+00	1.053+00
5.000+03	1.000-08	3.428-04	6.503+11	1.000+00	8.869+00	.00391	2.638+11	1.957+01	2.157+05	1.672+00	1.053+00
5.000+03	1.000-07	3.413-03	6.469+11	1.002+00	8.372+00	.00124	2.084+11	1.509+02	2.214+05	1.716+00	1.053+00
5.000+03	1.000-06	3.354-02	6.381+11	1.019+00	7.876+00	.00039	4.296+11	8.724+03	2.079+05	1.860+00	1.053+00
5.000+03	1.000-05	2.959-01	5.811+11	1.154+00	7.380+00	.00012	1.732+12	4.691+05	1.862+05	-7.192-01	1.052+00
5.000+03	1.000-04	2.065+00	4.454+11	1.654+00	6.884+00	.00004	2.242+12	5.725+06	1.534+05	8.633-01	1.047+00
5.000+03	1.000-03	1.441+01	3.468+11	2.370+00	6.388+00	.00001	1.279+12	2.974+07	1.274+05	9.420-01	1.042+00
5.000+03	1.000-02	1.062+02	2.930+11	3.216+00	5.892+00	.00000	8.110+11	2.001+08	1.088+05	9.648-01	1.037+00
5.000+03	1.000-01	7.141+02	2.525+11	4.783+00	5.396+00	.00000	5.810+11	1.395+09	8.808+04	9.791-01	1.029+00
5.000+03	1.000+00	5.124+03	2.303+11	6.665+00	4.900+00	.00000	3.715+11	5.944+09	7.355+04	9.859-01	1.023+00
5.000+03	1.000+01	4.307+04	2.216+11	7.930+00	4.404+00	.00000	2.787+11	2.205+10	6.713+04	9.884-01	1.020+00
5.500+03	1.000-10	4.241-06	7.765+11	1.000+00	1.035+01	.12875	3.228+12	5.762+00	2.175+05	1.242+00	1.055+00
5.500+03	1.000-09	3.917-05	6.937+11	1.000+00	9.782+00	.04268	1.217+12	2.007+01	2.123+05	1.417+00	1.057+00
5.500+03	1.000-08	3.808-04	6.659+11	1.000+00	9.229+00	.01370	4.931+11	6.566+01	2.169+05	1.573+00	1.058+00
5.500+03	1.000-07	3.771-03	6.566+11	1.001+00	8.681+00	.00435	2.610+11	2.350+02	2.267+05	1.658+00	1.058+00
5.500+03	1.000-06	3.742-02	6.514+11	1.005+00	8.135+00	.00138	2.457+11	3.220+03	2.285+05	1.717+00	1.058+00
5.500+03	1.000-05	3.578-01	6.301+11	1.050+00	7.589+00	.00044	6.995+11	2.047+05	2.106+05	2.151+00	1.058+00
5.500+03	1.000-04	2.863+00	5.355+11	1.312+00	7.043+00	.00014	1.820+12	5.843+06	1.830+05	5.399-01	1.054+00
5.500+03	1.000-03	1.952+01	4.083+11	1.924+00	6.498+00	.00004	1.541+12	4.502+07	1.495+05	8.960-01	1.048+00
5.500+03	1.000-02	1.390+02	3.301+11	2.702+00	5.952+00	.00001	9.221+11	2.584+08	1.253+05	9.475-01	1.043+00
5.500+03	1.000-01	9.458+02	2.788+11	3.972+00	5.407+00	.00000	6.418+11	1.871+09	1.021+05	9.700-01	1.034+00
5.500+03	1.000+00	6.362+03	2.472+11	5.906+00	4.861+00	.00000	4.122+11	8.958+09	8.213+04	9.817-01	1.026+00
5.500+03	1.000+01	5.007+04	2.340+11	7.504+00	4.315+00	.00000	2.958+11	3.344+10	7.225+04	9.861-01	1.022+00
6.000+03	1.000-10	5.432-06	9.733+11	1.000+00	1.088+01	.32534	5.884+12	1.267+01	2.459+05	1.147+00	1.057+00
6.000+03	1.000-09	4.561-05	7.726+11	1.000+00	1.021+01	.11766	2.557+12	5.330+01	2.273+05	1.267+00	1.060+00
6.000+03	1.000-08	4.258-04	6.964+11	1.000+00	9.597+00	.03883	9.761+11	1.840+02	2.233+05	1.441+00	1.062+00
6.000+03	1.000-07	4.149-03	6.708+11	1.000+00	8.995+00	.01245	4.158+11	6.070+02	2.292+05	1.582+00	1.063+00
6.000+03	1.000-06	4.107-02	6.618+11	1.002+00	8.397+00	.00395	2.499+11	2.822+03	2.382+05	1.658+00	1.063+00
6.000+03	1.000-05	4.028-01	6.513+11	1.019+00	7.801+00	.00125	3.558+11	8.897+04	2.313+05	1.774+00	1.063+00
6.000+03	1.000-04	3.580+00	5.984+11	1.145+00	7.206+00	.00040	1.115+12	4.187+06	2.081+05	-1.676+02	1.061+00
6.000+03	1.000-03	2.583+01	4.754+11	1.587+00	6.611+00	.00013	1.526+12	5.478+07	1.735+05	7.875-01	1.055+00
6.000+03	1.000-02	1.764+02	3.727+11	2.297+00	6.015+00	.00004	1.050+12	3.439+08	1.428+05	9.200-01	1.049+00
6.000+03	1.000-01	1.220+03	3.077+11	3.359+00	5.420+00	.00001	7.001+11	2.350+09	1.166+05	9.575-01	1.040+00
6.000+03	1.000+00	7.894+03	2.658+11	5.193+00	4.825+00	.00000	4.548+11	1.251+10	9.173+04	9.760-01	1.030+00
6.000+03	1.000+01	5.821+04	2.472+11	7.041+00	4.230+00	.00000	3.171+11	4.746+10	7.770+04	9.832-01	1.024+00
6.500+03	1.000-10	6.772-06	1.176+12	1.073+12	1.150+01	.52505	1.768+12	3.940+00	2.804+05	1.119+00	1.058+00
6.500+03	1.000-09	5.611-05	9.212+11	1.000+00	1.068+01	.26367	4.365+12	1.086+02	2.511+05	1.176+00	1.062+00
6.500+03	1.000-08	4.851-04	7.550+11	1.000+00	9.977+00	.09256	1.805+12	4.279+02	2.357+05	1.314+00	1.065+00
6.500+03	1.000-07	4.574-03	6.944+11	1.000+00	9.314+00	.03026	7.062+11	1.451+03	2.346+05	1.484+00	1.067+00
6.500+03	1.000-06	4.480-02	6.741+11	1.001+00	8.663+00	.00967	3.323+11	5.056+03	2.425+05	1.601+00	1.067+00
6.500+03	1.000-05	4.418-01	6.643+11	1.005+00	8.017+00	.00307	2.704+11	5.129+04	2.466+05	1.681+00	1.067+00
6.500+03	1.000-04	4.154+00	6.352+11	1.070+00	7.371+00	.00097	6.443+11	2.550+06	2.283+05	2.148+00	1.066+00
6.500+03	1.000-03	3.254+01	5.364+11	1.365+00	6.726+00	.00031	1.284+12	5.462+07	1.968+05	4.693-01	1.061+00
6.500+03	1.000-02	2.250+02	4.198+11	1.973+00	6.081+00	.00010	1.122+12	4.277+08	1.612+05	8.725-01	1.054+00

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASB	EGAM	EGAM2/ GAMMA
6.500+03	1.000-01	1.535+03	3.393+11	2.892+00	5.437+00	.00003	7.663+11	2.873+09	1.315+05	9.400-01	1.046+00
6.500+03	1.000+00	9.737+03	2.864+11	4.561+00	4.792+00	.00001	5.013+11	1.653+10	1.021+05	9.684-01	1.034+00
6.500+03	1.000+01	6.760+04	2.614+11	6.568+00	4.147+00	.00000	3.436+11	6.394+10	8.341+04	9.797-01	1.026+00
7.000+03	1.000-10	7.615-06	1.255+12	1.000+00	1.247+01	.59253	1.900+12	4.584+00	2.971+05	1.118+00	1.062+00
7.000+03	1.000-09	7.078-05	1.140+12	1.000+00	1.121+01	.48011	5.564+12	1.604+02	2.825+05	1.132+00	1.063+00
7.000+03	1.000-08	5.648-04	8.564+11	1.000+00	1.038+01	.18956	2.938+12	8.289+02	2.543+05	1.224+00	1.067+00
7.000+03	1.000-07	5.090-03	7.341+11	1.000+00	9.642+00	.06441	1.169+12	3.043+03	2.441+05	1.380+00	1.070+00
7.000+03	1.000-06	4.880-02	6.914+11	1.000+00	8.934+00	.02084	4.860+11	1.025+04	2.471+05	1.532+00	1.072+00
7.000+03	1.000-05	4.795-01	6.759+11	1.004+00	8.235+00	.00664	2.813+11	4.985+04	2.552+05	1.628+00	1.072+00
7.000+03	1.000-04	4.625+00	6.573+11	1.036+00	7.539+00	.00210	4.129+11	1.525+06	2.466+05	1.797+00	1.071+00
7.000+03	1.000-03	3.894+01	5.852+11	1.229+00	6.844+00	.00067	9.819+11	4.735+07	2.177+05	-1.952+00	1.067+00
7.000+03	1.000-02	2.770+02	4.681+11	1.727+00	6.150+00	.00021	1.110+12	4.806+08	1.795+05	7.848-01	1.060+00
7.000+03	1.000-01	1.892+03	3.739+11	2.528+00	5.455+00	.00007	8.416+11	3.435+09	1.462+05	9.147-01	1.051+00
7.000+03	1.000+00	1.190+04	3.092+11	4.018+00	4.761+00	.00002	5.575+11	2.101+10	1.130+05	9.583-01	1.039+00
7.000+03	1.000+01	7.833+04	2.769+11	6.105+00	4.066+00	.00001	3.771+11	8.278+10	8.929+04	9.753-01	1.029+00
7.500+03	1.000-10	8.506-06	1.338+12	1.209+12	1.336+01	.66019	2.010+12	5.275+00	3.141+05	1.117+00	1.064+00
7.500+03	1.000-09	7.968-05	1.223+12	1.102+12	1.198+01	.55529	1.647+12	4.707+01	3.062+05	1.129+00	1.066+00
7.500+03	1.000-08	6.847-04	1.007+12	1.000+00	1.082+01	.33647	4.019+12	1.373+03	2.793+05	1.170+00	1.069+00
7.500+03	1.000-07	5.750-03	7.966+11	1.000+00	9.983+00	.12237	1.780+12	6.158+03	2.582+05	1.294+00	1.073+00
7.500+03	1.000-06	5.330-02	7.161+11	1.000+00	9.210+00	.04046	6.977+11	2.483+04	2.549+05	1.459+00	1.075+00
7.500+03	1.000-05	5.183-01	6.886+11	1.001+00	8.457+00	.01298	3.350+11	1.325+05	2.629+05	1.583+00	1.076+00
7.500+03	1.000-04	5.075+00	6.742+11	1.014+00	7.710+00	.00412	4.134+11	2.174+06	2.612+05	1.680+00	1.076+00
7.500+03	1.000-03	4.563+01	6.257+11	1.124+00	6.965+00	.00131	1.030+12	5.974+07	2.423+05	2.706+00	1.074+00
7.500+03	1.000-02	3.381+02	5.106+11	1.516+00	6.221+00	.00041	1.123+12	6.278+08	2.084+05	6.106-01	1.067+00
7.500+03	1.000-01	2.324+03	4.048+11	2.205+00	5.476+00	.00013	8.231+11	4.656+09	1.714+05	8.785-01	1.058+00
7.500+03	1.000+00	1.456+04	3.277+11	3.519+00	4.732+00	.00004	4.909+11	2.969+10	1.339+05	9.455-01	1.045+00
7.500+03	1.000+01	9.067+04	2.840+11	5.651+00	3.988+00	.00001	1.789+11	1.044+11	1.065+05	9.708-01	1.032+00
8.000+03	1.000-10	9.443-06	1.428+12	1.284+12	1.425+01	.72801	2.143+12	6.015+00	3.308+05	1.115+00	1.067+00
8.000+03	1.000-09	8.830-05	1.297+12	1.162+12	1.278+01	.61582	1.755+12	5.370+01	3.221+05	1.128+00	1.069+00
8.000+03	1.000-08	8.226-04	1.180+12	1.055+12	1.132+01	.50524	1.410+12	4.725+02	3.135+05	1.143+00	1.071+00
8.000+03	1.000-07	6.613-03	8.889+11	7.884+11	1.034+01	.21000	2.512+12	9.150+03	2.764+05	1.231+00	1.075+00
8.000+03	1.000-06	5.858-02	7.527+11	6.636+11	9.494+00	.07198	1.014+12	3.420+04	2.645+05	1.385+00	1.079+00
8.000+03	1.000-05	5.592-01	7.047+11	6.197+11	8.682+00	.02335	4.179+11	1.139+05	2.685+05	1.534+00	1.080+00
8.000+03	1.000-04	5.506+00	6.890+11	6.053+11	7.883+00	.00744	2.161+11	3.661+05	2.816+05	1.617+00	1.081+00
8.000+03	1.000-03	5.372+01	6.747+11	1.020+00	7.088+00	.00236	1.259+12	7.600+07	2.657+05	1.715+00	1.081+00
8.000+03	1.000-02	4.169+02	5.668+11	1.306+00	6.294+00	.00075	1.516+12	8.516+08	2.359+05	-3.369-01	1.075+00
8.000+03	1.000-01	2.905+03	4.463+11	1.882+00	5.500+00	.00024	1.130+12	6.551+09	1.949+05	8.066-01	1.066+00
8.000+03	1.000+00	1.810+04	3.523+11	3.023+00	4.706+00	.00007	6.669+11	4.296+10	1.514+05	9.255-01	1.052+00
8.000+03	1.000+01	1.052+05	2.924+11	5.197+00	3.912+00	.00002	2.116+11	1.319+11	1.156+05	9.652-01	1.036+00
8.500+03	1.000-10	1.043-05	1.523+12	1.364+12	1.514+01	.79598	2.276+12	6.804+00	3.474+05	1.114+00	1.069+00
8.500+03	1.000-09	9.735-05	1.375+12	1.227+12	1.357+01	.67651	1.864+12	6.077+01	3.380+05	1.127+00	1.072+00
8.500+03	1.000-08	9.050-04	1.243+12	1.106+12	1.203+01	.55866	1.497+12	5.351+02	3.286+05	1.142+00	1.074+00
8.500+03	1.000-07	7.709-03	1.012+12	8.949+11	1.073+01	.32772	3.171+12	1.308+04	2.986+05	1.189+00	1.077+00
8.500+03	1.000-06	6.495-02	8.046+11	7.059+11	9.787+00	.11866	1.405+12	5.517+04	2.771+05	1.319+00	1.082+00
8.500+03	1.000-05	6.034-01	7.257+11	6.340+11	8.913+00	.03918	5.640+11	1.905+05	2.749+05	1.481+00	1.084+00
8.500+03	1.000-04	5.879+00	6.993+11	6.099+11	8.059+00	.01256	2.646+11	6.193+05	2.855+05	1.591+00	1.085+00
8.500+03	1.000-03	5.830+01	6.908+11	6.022+11	7.213+00	.00399	1.665+11	1.975+06	2.992+05	1.641+00	1.088+00
8.500+03	1.000-02	5.309+02	6.447+11	1.095+00	6.369+00	.00126	2.157+12	1.216+09	2.715+05	2.185+00	1.083+00
8.500+03	1.000-01	3.726+03	5.051+11	1.559+00	5.525+00	.00040	1.647+12	9.729+09	2.258+05	5.960-01	1.075+00
8.500+03	1.000+00	2.305+04	3.868+11	2.520+00	4.682+00	.00013	9.574+11	8.477+10	1.742+05	8.898-01	1.068+00
8.500+03	1.000+01	1.225+05	3.024+11	4.743+00	3.839+00	.00004	2.542+11	1.675+11	1.280+05	9.581-01	1.041+00

THETA	RHO	P1	E	CAPAR/ EIONIZ	CAPAC/ SYNPOT	FEW	CV	PB1	ASQ	EGAM	EGAM2/ GAMMA
9.000+03	1.000-10	1.146-05	1.624+12	1.450+12	1.603+01	.86408	2.409+12	7.642+00	3.640+05	1.113+00	1.072+00
9.000+03	1.000-09	1.067-04	1.457+12	1.295+12	1.437+01	.73734	1.973+12	6.828+01	3.538+05	1.126+00	1.074+00
9.000+03	1.000-08	9.942-04	1.309+12	1.159+12	1.273+01	.61223	1.584+12	6.015+02	3.436+05	1.141+00	1.077+00
9.000+03	1.000-07	5.018-03	1.158+12	1.021+12	1.115+01	.46685	3.521+12	1.620+04	3.237+05	1.163+00	1.079+00
9.000+03	1.000-06	7.272-02	8.743+11	7.638+11	1.009+01	.18278	1.836+12	8.200+04	2.925+05	1.267+00	1.084+00
9.000+03	1.000-05	6.529-01	7.538+11	6.546+11	9.148+00	.06193	7.454+11	2.990+05	2.833+05	1.426+00	1.088+00
9.000+03	1.000-04	6.271+00	7.120+11	6.167+11	8.238+00	.02002	3.270+11	9.883+05	2.901+05	1.560+00	1.089+00
9.000+03	1.000-03	6.187+01	6.98[illegible]+11	6.043+11	7.340+00	.00637	1.867+11	3.169+06	3.041+05	1.628+00	1.090+00
9.000+03	1.000-02	6.160+02	6.940+11	6.004+11	6.446+00	.00202	1.415+11	1.006+07	3.147+05	1.654+00	1.090+00
9.000+03	1.000-01	4.976+03	5.945+11	1.237+00	5.552+00	.00064	2.618+12	1.568+10	2.697+05	-1.154+01	1.085+00
9.000+03	1.000+00	3.043+04	4.382+11	2.021+00	4.659+00	.00020	1.489+12	1.045+11	2.059+05	8.077-01	1.070+00
9.000+03	1.000+01	1.434+05	3.145+11	4.289+00	3.767+00	.00006	3.110+11	2.150+11	1.379+05	9.489-01	1.046+00
9.500+03	1.000-10	1.254-05	1.731+12	1.540+12	1.693+01	.93228	2.544+12	8.528+00	3.806+05	1.112+00	1.073+00
9.500+03	1.000-09	1.167-04	1.545+12	1.367+12	1.517+01	.79830	2.082+12	7.622+01	3.696+05	1.125+00	1.077+00
9.500+03	1.000-08	1.081-03	1.380+12	1.215+12	1.343+01	.66594	1.671+12	6.718+02	3.587+05	1.140+00	1.079+00
9.500+03	1.000-07	9.967-03	1.235+12	1.084+12	1.173+01	.53584	1.309+12	5.815+03	3.478+05	1.159+00	1.082+00
9.500+03	1.000-06	8.206-02	9.625+11	8.378+11	1.042+01	.26456	2.247+12	1.124+05	3.108+05	1.228+00	1.086+00
9.500+03	1.000-05	7.092-01	7.904+11	6.826+11	9.391+00	.09291	9.573+11	4.432+05	2.936+05	1.375+00	1.091+00
9.500+03	1.000-04	6.687+00	7.277+11	6.260+11	8.421+00	.03038	4.035+11	1.500+06	2.958+05	1.525+00	1.093+00
9.500+03	1.000-03	6.553+01	7.069+11	6.073+11	7.470+00	.00971	2.119+11	4.844+06	3.088+05	1.613+00	1.094+00
9.500+03	1.000-02	6.510+02	7.003+11	6.014+11	6.525+00	.00308	1.496+11	1.542+07	3.210+05	1.648+00	1.094+00
9.500+03	1.000-01	6.496+03	6.982+11	5.994+11	5.582+00	.00098	1.297+11	4.887+07	3.274+05	1.661+00	1.094+00
9.500+03	1.000+00	4.267+04	5.233+11	1.522+00	4.639+00	.00031	2.625+12	1.890+11	2.544+05	4.253-01	1.083+00
9.500+03	1.000+01	1.693+05	3.295+11	3.834+00	3.696+00	.00010	3.891+11	2.802+11	1.519+05	9.363-01	1.052+00
1.000+04	1.000-10	1.367-05	1.843+12	1.635+12	1.782+01	1.00059	2.678+12	9.464+00	3.972+05	1.111+00	1.075+00
1.000+04	1.000-09	1.270-04	1.637+12	1.444+12	1.597+01	.85937	2.191+12	8.460+01	3.855+05	1.124+00	1.079+00
1.000+04	1.000-08	1.175-03	1.453+12	1.275+12	1.414+01	.71978	1.758+12	7.460+02	3.737+05	1.139+00	1.082+00
1.000+04	1.000-07	1.081-02	1.293+12	1.129+12	1.234+01	.58245	1.377+12	6.462+03	3.619+05	1.158+00	1.085+00
1.000+04	1.000-06	9.299-02	1.067+12	9.253+11	1.077+01	.36132	2.563+12	1.420+05	3.313+05	1.201+00	1.088+00
1.000+04	1.000-05	7.740-01	8.366+11	7.189+11	9.642+00	.13312	1.190+12	6.231+05	3.057+05	1.330+00	1.094+00
1.000+04	1.000-04	7.133+00	7.469+11	6.385+11	8.607+00	.04420	4.938+11	2.177+06	3.026+05	1.487+00	1.097+00
1.000+04	1.000-03	6.928+01	7.167+11	6.114+11	7.602+00	.01420	2.423+11	7.103+06	3.136+05	1.594+00	1.098+00
1.000+04	1.000-02	6.862+02	7.069+11	6.026+11	6.606+00	.00451	1.594+11	2.268+07	3.270+05	1.642+00	1.098+00
1.000+04	1.000-01	6.841+03	7.038+11	5.999+11	5.612+00	.00143	1.328+11	7.195+07	3.348+05	1.658+00	1.098+00
1.000+04	1.000+00	6.685+04	6.916+11	1.022+00	4.620+00	.00045	5.813+12	4.250+11	3.433+05	1.728+00	1.098+00
1.000+04	1.000+01	2.022+05	3.485+11	3.380+00	3.628+00	.00014	5.007+11	3.731+11	1.689+05	9.181-01	1.059+00
1.050+04	1.000-10	1.464-05	1.961+12	1.736+12	1.872+01	1.06900	2.812+12	1.045+01	4.137+05	1.110+00	1.077+00
1.050+04	1.000-09	1.376-04	1.733+12	1.524+12	1.677+01	.92053	2.301+12	9.343+01	4.012+05	1.123+00	1.081+00
1.050+04	1.000-08	1.272-03	1.531+12	1.338+12	1.485+01	.77373	1.845+12	8.241+02	3.887+05	1.138+00	1.084+00
1.050+04	1.000-07	1.169-02	1.354+12	1.176+12	1.295+01	.62920	1.445+12	7.143+03	3.761+05	1.157+00	1.087+00
1.050+04	1.000-06	1.052-01	1.181+12	1.021+12	1.114+01	.46720	2.712+12	1.645+05	3.533+05	1.183+00	1.090+00
1.050+04	1.000-05	8.465-01	8.929+11	7.640+11	9.902+00	.18295	1.427+12	8.335+05	3.197+05	1.292+00	1.096+00
1.050+04	1.000-04	7.617+00	7.704+11	6.546+11	8.798+00	.06199	5.964+11	3.040+06	3.106+05	1.449+00	1.100+00
1.050+04	1.000-03	7.316+01	7.279+11	6.167+11	7.737+00	.02004	2.777+11	1.005+07	3.188+05	1.573+00	1.102+00
1.050+04	1.000-02	7.218+02	7.140+11	6.043+11	6.689+00	.00638	1.709+11	3.222+07	3.326+05	1.633+00	1.102+00
1.050+04	1.000-01	7.187+03	7.096+11	6.004+11	5.645+00	.00202	1.365+11	1.023+08	3.419+05	1.656+00	1.103+00
1.050+04	1.000+00	7.177+04	7.082+11	5.991+11	4.603+00	.00064	1.256+11	3.240+08	3.459+05	1.663+00	1.103+00
1.050+04	1.000+01	2.452+05	3.734+11	2.926+00	3.561+00	.00020	6.681+11	5.122+11	1.900+05	8.896-01	1.067+00
1.100+04	1.000-10	1.606-05	2.085+12	1.841+12	1.962+01	1.13751	2.947+12	1.148+01	4.303+05	1.109+00	1.078+00
1.100+04	1.000-09	1.489-04	1.835+12	1.609+12	1.758+01	.98179	2.411+12	1.027+02	4.170+05	1.122+00	1.082+00
1.100+04	1.000-08	1.373-03	1.612+12	1.404+12	1.556+01	.82779	1.933+12	9.061+02	4.036+05	1.137+00	1.086+00

THETA	RHO	P1	E	CAPAR/ E1ONIZ	CAPAC/ SYMPOT	FEW	CV	PB1	AS0	EGAM	EGAM2/ GAMMA
1.100+04	1.000-07	1.259-02	1.418+12	1.224+12	1.357+01	.67606	1.513+12	7.858+03	3.902+05	1.156+00	1.090+00
1.100+04	1.000-06	1.148-01	1.250+12	1.076+12	1.162+01	.52762	1.150+12	6.656+04	3.770+05	1.178+00	1.093+00
1.100+04	1.000-05	9.333-01	9.593+11	8.175+11	1.017+01	.24209	1.650+12	1.063+06	3.353+05	1.262+00	1.099+00
1.100+04	1.000-04	8.147+00	7.985+11	6.747+11	8.993+00	.08415	7.088+11	4.097+06	3.197+05	1.413+00	1.103+00
1.100+04	1.000-03	7.720+01	7.407+11	6.234+11	7.874+00	.02742	3.181+11	1.377+07	3.244+05	1.550+00	1.106+00
1.100+04	1.000-02	7.580+02	7.217+11	6.065+11	6.773+00	.00876	1.842+11	4.438+07	3.381+05	1.624+00	1.106+00
1.100+04	1.000-01	7.535+03	7.156+11	6.011+11	5.679+00	.00278	1.408+11	1.412+08	3.487+05	1.652+00	1.107+00
1.100+04	1.000+00	7.521+04	7.137+11	5.994+11	4.587+00	.00088	1.269+11	4.474+08	3.536+05	1.662+00	1.107+00
1.100+04	1.000+01	3.041+05	4.074+11	2.472+00	3.496+00	.00028	9.358+11	7.342+11	2.176+05	8.388-01	1.076+00
1.150+04	1.000-10	1.733-05	2.215+12	1.952+12	2.052+01	1.20610	3.082+12	1.256+01	4.468+05	1.109+00	1.079+00
1.150+04	1.000-09	1.605-04	1.941+12	1.697+12	1.838+01	1.04315	2.521+12	1.124+02	4.328+05	1.121+00	1.084+00
1.150+04	1.000-08	1.478-03	1.698+12	1.473+12	1.627+01	.88192	2.020+12	9.921+02	4.186+05	1.136+00	1.088+00
1.150+04	1.000-07	1.354-02	1.484+12	1.279+12	1.418+01	.72302	1.581+12	8.607+03	4.044+05	1.155+00	1.092+00
1.150+04	1.000-06	1.231-01	1.301+12	1.114+12	1.214+01	.56741	1.201+12	7.296+04	3.903+05	1.178+00	1.096+00
1.150+04	1.000-05	1.029+00	1.035+12	8.782+11	1.046+01	.30932	1.836+12	1.293+06	3.523+05	1.239+00	1.101+00
1.150+04	1.000-04	8.728+00	8.316+11	6.989+11	9.194+00	.11097	8.276+11	5.346+06	3.299+05	1.380+00	1.106+00
1.150+04	1.000-03	8.143+01	7.554+11	6.316+11	8.013+00	.03653	3.630+11	1.835+07	3.307+05	1.526+00	1.109+00
1.150+04	1.000-02	7.948+02	7.299+11	6.091+11	6.860+00	.01170	1.992+11	5.953+07	3.435+05	1.613+00	1.110+00
1.150+04	1.000-01	7.865+03	7.218+11	6.019+11	5.715+00	.00371	1.456+11	1.898+08	3.551+05	1.648+00	1.111+00
1.150+04	1.000+00	7.865+04	7.192+11	5.996+11	4.573+00	.00118	1.284+11	6.016+08	3.610+05	1.661+00	1.111+00
1.150+04	1.000+01	3.895+05	4.568+11	2.018+00	3.432+00	.00037	1.404+12	1.121+12	2.557+05	7.216-01	1.086+00
1.200+04	1.000-10	1.865-05	2.351+12	2.067+12	2.142+01	1.27477	3.217+12	1.370+01	4.634+05	1.108+00	1.080+00
1.200+04	1.000-09	1.725-04	2.052+12	1.790+12	1.919+01	1.10459	2.631+12	1.225+02	4.486+05	1.120+00	1.085+00
1.200+04	1.000-08	1.587-03	1.786+12	1.545+12	1.698+01	.93615	2.108+12	1.082+03	4.336+05	1.135+00	1.090+00
1.200+04	1.000-07	1.451-02	1.554+12	1.333+12	1.480+01	.77008	1.649+12	9.390+03	4.185+05	1.154+00	1.095+00
1.200+04	1.000-06	1.318-01	1.354+12	1.154+12	1.266+01	.60732	1.253+12	7.965+04	4.035+05	1.177+00	1.099+00
1.200+04	1.000-05	1.133+00	1.117+12	9.445+11	1.076+01	.38256	1.966+12	1.502+06	3.705+05	1.222+00	1.103+00
1.200+04	1.000-04	9.366+00	8.698+11	7.275+11	9.401+00	.14256	9.487+11	6.770+06	3.412+05	1.350+00	1.109+00
1.200+04	1.000-03	8.587+01	7.720+11	6.415+11	8.156+00	.04751	4.119+11	2.385+07	3.375+05	1.502+00	1.113+00
1.200+04	1.000-02	8.323+02	7.389+11	6.124+11	6.948+00	.01528	2.157+11	7.798+07	3.489+05	1.601+00	1.114+00
1.200+04	1.000-01	8.237+03	7.282+11	6.030+11	5.753+00	.00486	1.509+11	2.492+08	3.614+05	1.644+00	1.115+00
1.200+04	1.000+00	8.210+04	7.247+11	6.000+11	4.560+00	.00154	1.301+11	7.907+08	3.681+05	1.659+00	1.115+00
1.200+04	1.000+01	5.244+05	5.348+11	1.564+00	3.369+00	.00049	2.336+12	1.890+12	3.133+05	1.666-01	1.099+00
1.250+04	1.000-10	2.001-05	2.492+12	2.188+12	2.232+01	1.34353	3.352+12	1.488+01	4.799+05	1.107+00	1.081+00
1.250+04	1.000-09	1.850-04	2.168+12	1.887+12	2.000+01	1.16611	2.741+12	1.331+02	4.643+05	1.119+00	1.086+00
1.250+04	1.000-08	1.700-03	1.879+12	1.621+12	1.769+01	.99047	2.196+12	1.176+03	4.485+05	1.134+00	1.092+00
1.250+04	1.000-07	1.552-02	1.626+12	1.391+12	1.542+01	.81724	1.718+12	1.021+04	4.326+05	1.153+00	1.097+00
1.250+04	1.000-06	1.407-01	1.409+12	1.195+12	1.319+01	.64733	1.304+12	8.664+04	4.167+05	1.176+00	1.101+00
1.250+04	1.000-05	1.246+00	1.203+12	1.014+12	1.108+01	.45903	2.024+12	1.666+06	3.894+05	1.209+00	1.105+00
1.250+04	1.000-04	1.007+01	9.133+11	7.603+11	9.614+00	.17884	1.067+12	8.338+06	3.534+05	1.324+00	1.112+00
1.250+04	1.000-03	9.055+01	7.909+11	6.533+11	8.302+00	.06049	4.639+11	3.030+07	3.450+05	1.477+00	1.116+00
1.250+04	1.000-02	8.706+02	7.486+11	6.162+11	7.039+00	.01954	2.338+11	1.000+08	3.545+05	1.588+00	1.118+00
1.250+04	1.000-01	8.592+03	7.348+11	6.042+11	5.791+00	.00622	1.568+11	3.206+08	3.675+05	1.639+00	1.118+00
1.250+04	1.000+00	8.556+04	7.304+11	6.003+11	4.549+00	.00197	1.320+11	1.018+09	3.751+05	1.658+00	1.119+00
1.250+04	1.000+01	7.697+05	6.765+11	1.110+00	3.308+00	.00062	4.635+12	3.782+12	4.137+05	2.000+00	1.115+00
1.300+04	1.000-10	2.142-05	2.640+12	2.314+12	2.323+01	1.41235	3.488+12	1.611+01	4.964+05	1.106+00	1.082+00
1.300+04	1.000-09	1.978-04	2.288+12	1.988+12	2.080+01	1.22770	2.852+12	1.442+02	4.800+05	1.119+00	1.088+00
1.300+04	1.000-08	1.816-03	1.976+12	1.700+12	1.840+01	1.04487	2.285+12	1.273+03	4.634+05	1.134+00	1.093+00
1.300+04	1.000-07	1.656-02	1.702+12	1.450+12	1.604+01	.86446	1.786+12	1.106+04	4.467+05	1.152+00	1.099+00
1.300+04	1.000-06	1.499-01	1.466+12	1.239+12	1.371+01	.68743	1.356+12	9.392+04	4.299+05	1.175+00	1.104+00
1.300+04	1.000-05	1.346+00	1.269+12	1.065+12	1.146+01	.51542	9.920+11	7.730+05	4.133+05	1.203+00	1.107+00

THETA	RHO	P1	E	CAPAR/ E1ON12	CAPAC/ SYNPOT	FEW	CV	PB1	ASO	EGAM	EGAM2/ GAMMA
1.300+04	1.000-04	1.063+01	9.617+11	7.971+11	9.835+00	.21953	1.178+12	1.000+07	3.666+05	1.302+00	1.114+00
1.300+04	1.000-03	9.551+01	8.120+11	6.669+11	8.451+00	.07555	5.184+11	3.771+07	3.531+05	1.453+00	1.119+00
1.300+04	1.000-02	9.098+02	7.590+11	6.208+11	7.131+00	.02454	2.533+11	1.259+08	3.603+05	1.574+00	1.121+00
1.300+04	1.000-01	8.950+03	7.417+11	6.056+11	5.832+00	.00783	1.632+11	4.051+08	3.734+05	1.634+00	1.122+00
1.300+04	1.000+00	8.902+04	7.361+11	6.008+11	4.539+00	.00248	1.341+11	1.288+09	3.819+05	1.656+00	1.123+00
1.300+04	1.000+01	8.887+05	7.344+11	5.993+11	3.249+00	.00079	1.248+11	4.080+09	3.854+05	1.663+00	1.123+00
1.350+04	1.000-10	2.268-05	2.793+12	2.445+12	2.413+01	1.48125	3.624+12	1.739+01	5.129+05	1.106+00	1.083+00
1.350+04	1.000-09	2.111-04	2.414+12	2.093+12	2.161+01	1.28937	2.963+12	1.556+02	4.958+05	1.118+00	1.089+00
1.350+04	1.000-08	1.936-03	2.076+12	1.782+12	1.912+01	1.09934	2.373+12	1.375+03	4.784+05	1.133+00	1.094+00
1.350+04	1.000-07	1.763-02	1.780+12	1.512+12	1.666+01	.91177	1.855+12	1.195+04	4.607+05	1.151+00	1.100+00
1.350+04	1.000-06	1.593-01	1.526+12	1.284+12	1.424+01	.72762	1.407+12	1.015+05	4.430+05	1.174+00	1.106+00
1.350+04	1.000-05	1.428+00	1.313+12	1.096+12	1.189+01	.54851	1.029+12	8.361+05	4.256+05	1.203+00	1.110+00
1.350+04	1.000-04	1.166+01	1.015+12	8.374+11	1.006+01	.26413	1.276+12	1.169+07	3.806+05	1.284+00	1.116+00
1.350+04	1.000-03	1.008+02	8.356+11	6.824+11	8.603+00	.09274	5.743+11	4.607+07	3.617+05	1.431+00	1.122+00
1.350+04	1.000-02	9.502+02	7.704+11	6.260+11	7.225+00	.03032	2.739+11	1.559+08	3.663+05	1.560+00	1.125+00
1.350+04	1.000-01	9.311+03	7.488+11	6.073+11	5.874+00	.00969	1.700+11	5.035+08	3.793+05	1.628+00	1.126+00
1.350+04	1.000+00	9.250+04	7.419+11	6.013+11	4.531+00	.00307	1.363+11	1.603+09	3.885+05	1.654+00	1.126+00
1.350+04	1.000+01	9.231+05	7.397+11	5.994+11	3.190+00	.00097	1.255+11	5.079+09	3.925+05	1.663+00	1.126+00
1.400+04	1.000-10	2.418-05	2.906+12	2.539+12	2.505+01	1.52872	2.283+12	1.072+01	5.341+05	1.106+00	1.084+00
1.400+04	1.000-09	2.248-04	2.544+12	2.202+12	2.242+01	1.35110	3.074+12	1.676+02	5.115+05	1.117+00	1.090+00
1.400+04	1.000-08	2.060-03	2.180+12	1.867+12	1.983+01	1.15388	2.462+12	1.481+03	4.933+05	1.132+00	1.096+00
1.400+04	1.000-07	1.874-02	1.862+12	1.577+12	1.728+01	.95915	1.924+12	1.287+04	4.748+05	1.150+00	1.102+00
1.400+04	1.000-06	1.691-01	1.588+12	1.331+12	1.477+01	.76790	1.459+12	1.094+05	4.562+05	1.173+00	1.108+00
1.400+04	1.000-05	1.513+00	1.358+12	1.128+12	1.233+01	.58170	1.067+12	9.016+05	4.378+05	1.202+00	1.113+00
1.400+04	1.000-04	1.255+01	1.071+12	8.806+11	1.030+01	.31197	1.356+12	1.335+07	3.954+05	1.269+00	1.119+00
1.400+04	1.000-03	1.064+02	8.615+11	6.999+11	8.759+00	.11207	6.307+11	5.532+07	3.710+05	1.410+00	1.125+00
1.400+04	1.000-02	9.917+02	7.827+11	6.319+11	7.321+00	.03691	2.956+11	1.900+08	3.725+05	1.546+00	1.128+00
1.400+04	1.000-01	9.677+03	7.563+11	6.093+11	5.917+00	.01182	1.773+11	6.167+08	3.850+05	1.621+00	1.130+00
1.400+04	1.000+00	9.599+04	7.479+11	6.020+11	4.523+00	.00375	1.386+11	1.966+09	3.949+05	1.652+00	1.130+00
1.400+04	1.000+01	9.575+05	7.452+11	5.996+11	3.133+00	.00119	1.262+11	6.234+09	3.995+05	1.662+00	1.130+00
1.450+04	1.000-10	2.544-05	3.006+12	2.620+12	2.598+01	1.56824	2.363+12	1.151+01	5.474+05	1.107+00	1.086+00
1.450+04	1.000-09	2.390-04	2.678+12	2.315+12	2.323+01	1.41290	3.185+12	1.799+02	5.272+05	1.116+00	1.090+00
1.450+04	1.000-08	2.188-03	2.288+12	1.956+12	2.055+01	1.20848	2.550+12	1.590+03	5.082+05	1.131+00	1.097+00
1.450+04	1.000-07	1.988-02	1.946+12	1.644+12	1.790+01	1.00660	1.993+12	1.382+04	4.889+05	1.149+00	1.103+00
1.450+04	1.000-06	1.791-01	1.652+12	1.379+12	1.530+01	.80825	1.511+12	1.175+05	4.694+05	1.172+00	1.110+00
1.450+04	1.000-05	1.600+00	1.405+12	1.162+12	1.276+01	.61498	1.104+12	9.696+05	4.500+05	1.201+00	1.115+00
1.450+04	1.000-04	1.349+01	1.131+12	9.261+11	1.055+01	.36220	1.415+12	1.488+07	4.107+05	1.257+00	1.121+00
1.450+04	1.000-03	1.123+02	8.899+11	7.193+11	8.919+00	.13350	6.864+11	6.537+07	3.807+05	1.390+00	1.128+00
1.450+04	1.000-02	1.034+03	7.959+11	6.387+11	7.420+00	.04434	3.180+11	2.285+08	3.790+05	1.531+00	1.132+00
1.450+04	1.000-01	1.005+04	7.641+11	6.114+11	5.962+00	.01424	1.949+11	7.455+08	3.908+05	1.615+00	1.133+00
1.450+04	1.000+00	9.950+04	7.539+11	6.027+11	4.517+00	.00452	1.411+11	2.381+09	4.013+05	1.649+00	1.134+00
1.450+04	1.000+01	9.919+05	7.506+11	5.999+11	3.077+00	.00143	1.270+11	7.552+09	4.063+05	1.661+00	1.134+00
1.500+04	1.000-10	2.672-05	3.110+12	2.704+12	2.691+01	1.60780	2.443+12	1.233+01	5.607+05	1.108+00	1.087+00
1.500+04	1.000-09	2.536-04	2.818+12	2.433+12	2.404+01	1.47477	3.296+12	1.927+02	5.430+05	1.116+00	1.091+00
1.500+04	1.000-08	2.319-03	2.400+12	2.048+12	2.127+01	1.26315	2.639+12	1.704+03	5.231+05	1.130+00	1.098+00
1.500+04	1.000-07	2.105-02	2.033+12	1.713+12	1.853+01	1.05412	2.062+12	1.481+04	5.029+05	1.149+00	1.105+00
1.500+04	1.000-06	1.894-01	1.718+12	1.430+12	1.583+01	.84864	1.563+12	1.260+05	4.825+05	1.171+00	1.112+00
1.500+04	1.000-05	1.689+00	1.453+12	1.196+12	1.320+01	.64833	1.141+12	1.040+06	4.621+05	1.200+00	1.118+00
1.500+04	1.000-04	1.449+01	1.193+12	9.728+11	1.081+01	.41386	1.451+12	1.621+07	4.254+05	1.247+00	1.123+00
1.500+04	1.000-03	1.185+02	9.207+11	7.405+11	9.083+00	.15696	7.404+11	7.610+07	3.910+05	1.373+00	1.130+00
1.500+04	1.000-02	1.079+03	8.101+11	6.461+11	7.520+00	.05262	3.411+11	2.713+08	3.058+05	1.517+00	1.135+00

THETA	RHO	P1	E	CAPAR/ EIGNIZ	CAPAC/ SYMPOT	FEW	CV	PB1	ASO	EGAM	EGAM2/ GAMMA
1.500+04	1.000-01	1.042+04	7.723+11	6.139+11	6.008+00	.01695	1.929+11	8.905+08	3.966+05	1.608+00	1.137+00
1.500+04	1.000+00	1.030+05	7.600+11	6.034+11	4.512+00	.00539	1.436+11	2.849+09	4.075+05	1.647+00	1.137+00
1.500+04	1.000+01	1.026+06	7.561+11	6.001+11	3.022+00	.00171	1.278+11	9.044+09	4.129+05	1.660+00	1.138+00
1.550+04	1.000-10	2.803-05	3.217+12	2.791+12	2.784+01	1.64739	2.523+12	1.317+01	5.740+05	1.108+00	1.088+00
1.550+04	1.000-09	2.669-04	2.929+12	2.523+12	2.487+01	1.52103	2.086+12	1.183+02	5.647+05	1.116+00	1.092+00
1.550+04	1.000-08	2.454-03	2.516+12	2.143+12	2.199+01	1.31749	2.728+12	1.821+03	5.380+05	1.130+00	1.099+00
1.550+04	1.000-07	2.225-02	2.124+12	1.785+12	1.915+01	1.10171	2.131+12	1.583+04	5.170+05	1.148+00	1.106+00
1.550+04	1.000-06	2.000-01	1.786+12	1.482+12	1.636+01	.88913	1.615+12	1.347+05	4.956+05	1.171+00	1.113+00
1.550+04	1.000-05	1.781+00	1.503+12	1.232+12	1.364+01	.68176	1.179+12	1.113+06	4.743+05	1.199+00	1.120+00
1.550+04	1.000-04	1.552+01	1.256+12	1.020+12	1.107+01	.46594	1.461+12	1.728+07	4.424+05	1.239+00	1.125+00
1.550+04	1.000-03	1.252+02	9.537+11	7.634+11	9.252+00	.18232	7.918+11	8.735+07	4.018+05	1.357+00	1.133+00
1.550+04	1.000-02	1.124+03	8.253+11	6.544+11	7.622+00	.06176	3.646+11	3.184+08	3.928+05	1.502+00	1.138+00
1.550+04	1.000-01	1.080+04	7.808+11	6.166+11	6.055+00	.01996	2.011+11	1.052+09	4.024+05	1.601+00	1.140+00
1.550+04	1.000+00	1.066+05	7.663+11	6.043+11	4.509+00	.00634	1.463+11	3.374+09	4.136+05	1.644+00	1.141+00
1.550+04	1.000+01	1.061+06	7.616+11	6.004+11	2.968+00	.00201	1.287+11	1.072+10	4.195+05	1.659+00	1.141+00
1.600+04	1.000-10	2.937-05	3.327+12	2.881+12	2.877+01	1.68701	2.603+12	1.405+01	5.872+05	1.109+00	1.089+00
1.600+04	1.000-09	2.794-04	3.020+12	2.596+12	2.571+01	1.55661	2.152+12	1.262+02	5.774+05	1.117+00	1.094+00
1.600+04	1.000-08	2.543-03	2.635+12	2.241+12	2.271+01	1.37268	2.818+12	1.942+03	5.529+05	1.129+00	1.100+00
1.600+04	1.000-07	2.349-02	2.217+12	1.860+12	1.978+01	1.14935	2.200+12	1.689+04	5.310+05	1.147+00	1.107+00
1.600+04	1.000-06	2.109-01	1.857+12	1.536+12	1.689+01	.92467	1.667+12	1.438+05	5.088+05	1.170+00	1.115+00
1.600+04	1.000-05	1.875+00	1.555+12	1.270+12	1.408+01	.71527	1.216+12	1.188+06	4.865+05	1.199+00	1.122+00
1.600+04	1.000-04	1.649+01	1.310+12	1.059+12	1.137+01	.50904	8.470+11	9.405+06	4.646+05	1.235+00	1.128+00
1.600+04	1.000-03	1.322+02	9.888+11	7.879+11	9.425+00	.20943	8.395+11	9.857+07	4.130+05	1.343+00	1.135+00
1.600+04	1.000-02	1.171+03	8.415+11	6.635+11	7.727+00	.07176	3.883+11	3.697+08	4.002+05	1.489+00	1.141+00
1.600+04	1.000-01	1.118+04	7.896+11	6.196+11	6.104+00	.02328	2.096+11	1.231+09	4.083+05	1.593+00	1.144+00
1.600+04	1.000+00	1.101+05	7.726+11	6.053+11	4.506+00	.00742	1.491+11	3.956+09	4.196+05	1.641+00	1.144+00
1.600+04	1.000+01	1.096+06	7.672+11	6.007+11	2.915+00	.00235	1.296+11	1.258+10	4.259+05	1.658+00	1.145+00
1.650+04	1.000-10	3.073-05	3.441+12	2.974+12	2.970+01	1.72666	2.683+12	1.495+01	6.003+05	1.110+00	1.090+00
1.650+04	1.000-09	2.922-04	3.114+12	2.670+12	2.654+01	1.59223	2.217+12	1.343+02	5.900+05	1.118+00	1.095+00
1.650+04	1.000-08	2.736-03	2.758+12	2.343+12	2.342+01	1.42753	2.907+12	2.068+03	5.670+05	1.128+00	1.101+00
1.650+04	1.000-07	2.476-02	2.313+12	1.937+12	2.040+01	1.19705	2.270+12	1.799+04	5.450+05	1.146+00	1.108+00
1.650+04	1.000-06	2.221-01	1.930+12	1.592+12	1.743+01	.97028	1.719+12	1.531+05	5.219+05	1.169+00	1.117+00
1.650+04	1.000-05	1.971+00	1.608+12	1.308+12	1.452+01	.74884	1.254+12	1.266+06	4.987+05	1.198+00	1.124+00
1.650+04	1.000-04	1.731+01	1.347+12	1.084+12	1.172+01	.53562	8.727+11	1.003+07	4.758+05	1.234+00	1.130+00
1.650+04	1.000-03	1.395+02	1.026+12	8.138+11	9.602+00	.23810	8.826+11	1.107+08	4.246+05	1.331+00	1.138+00
1.650+04	1.000-02	1.220+03	8.587+11	6.733+11	7.833+00	.08262	4.120+11	4.251+08	4.077+05	1.475+00	1.144+00
1.650+04	1.000-01	1.157+04	7.988+11	6.229+11	6.155+00	.02691	2.183+11	1.427+09	4.142+05	1.586+00	1.147+00
1.650+04	1.000+00	1.137+05	7.791+11	6.063+11	4.505+00	.00859	1.520+11	4.599+09	4.256+05	1.638+00	1.148+00
1.650+04	1.000+01	1.130+06	7.728+11	6.010+11	2.864+00	.00272	1.305+11	1.463+10	4.323+05	1.657+00	1.148+00
1.700+04	1.000-10	3.213-05	3.559+12	3.070+12	3.063+01	1.76634	2.763+12	1.588+01	6.135+05	1.110+00	1.091+00
1.700+04	1.000-09	3.052-04	3.211+12	2.748+12	2.738+01	1.62788	2.283+12	1.427+02	6.027+05	1.118+00	1.096+00
1.700+04	1.000-08	2.883-03	2.886+12	2.448+12	2.415+01	1.48243	2.996+12	2.197+03	5.827+05	1.128+00	1.101+00
1.700+04	1.000-07	2.607-02	2.413+12	2.016+12	2.103+01	1.24481	2.339+12	1.911+04	5.591+05	1.146+00	1.109+00
1.700+04	1.000-06	2.335-01	2.005+12	1.650+12	1.796+01	1.01095	1.772+12	1.628+05	5.350+05	1.168+00	1.118+00
1.700+04	1.000-05	2.070+00	1.663+12	1.348+12	1.496+01	.78248	1.292+12	1.347+06	5.108+05	1.197+00	1.126+00
1.700+04	1.000-04	1.814+01	1.385+12	1.109+12	1.207+01	.56228	8.984+11	1.068+07	4.869+05	1.234+00	1.133+00
1.700+04	1.000-03	1.473+02	1.065+12	8.410+11	9.785+00	.26811	9.205+11	1.224+08	4.366+05	1.320+00	1.140+00
1.700+04	1.000-02	1.271+03	8.770+11	6.838+11	7.942+00	.09432	4.356+11	4.844+08	4.156+05	1.462+00	1.147+00
1.700+04	1.000-01	1.197+04	8.084+11	6.265+11	6.206+00	.03085	2.271+11	1.641+09	4.201+05	1.578+00	1.150+00
1.700+04	1.000+00	1.173+05	7.857+11	6.075+11	4.504+00	.00986	1.549+11	5.302+09	4.314+05	1.635+00	1.151+00
1.700+04	1.000+01	1.165+06	7.784+11	6.014+11	2.813+00	.00313	1.315+11	1.688+10	4.385+05	1.656+00	1.152+00

APPENDIX II

EGREY OUTPUT AND CARD INPUT

USED WITH GREYS

EGREY OUTPUT

(Edit output of GREY tape made by using card input. A listing of the card input follows this edit.)

BEGIN IHES2 RUN. INPUT IS

REMAKE OF GREY TAPE TO ADD NEW OPACITY SETS

INPUT JPATH VALUES ARE S Y

DIANE GREY TAPE 1/11/67 A.KNOPP MATERIALS ARE AIR,WET ALLUVIUM,AL,BE,

C,CF2,CH2,C-PHENOLGC,FE,BINA-IRONIC,GRANITE,GROUT,H,H-M-X,LIM,LIMESTONE,

NE,PHENOLIC,PLYCA,PLYFE,WET TUFF,REFRASIL,SEAWATER,S,SHALE,W,XE

THE NUMBER OF GREY SETS IS 31
DIANE GREY TAPE 1/11/67 A.KNOPP MATERIALS ARE AIR,WET ALLUVIUM,AL,BE,
C,CF2,CH2,C-PHENOLGC,FE,BINA-IRONIC,GRANITE,GROUT,H,H-M-X,LIM,LIMESTONE,
NE,PHENOLIC,PLYCA,PLYFE,WET TUFF,REFRASIL,SEAWATER,S,SHALE,W,XE
1001201 DIANE AIR-18A ,12 FREQUENCIES DECEMBER 21,1965 COMBINED WITH AIR-11F MATERL = 1102 NX = 742

GREY ABSORPTION COEFFICIENTS 23 TEMPERATURES

THETA = 1,29240 8 DENSITIES

DENSITY	1.29299364-02	1.29300025-03	1.29299390-04	1.29294884-05	1.29305887-06	1.29303950-07	1.29302039-08	1.29300121-09
KAPPA(P)	1.03073420+04	9.39018160+03	6.15770600+03	2.96072650+03	7.25608028+02	9.02559900+01	6.92699640+00	9.33720530-01
KAPPA(R)	0.73379330+02	4.63877240+02	2.78921370+02	1.50525120+02	4.21763640+01	5.46563330+00	6.38704570-01	1.29737770-01

THETA = 1,50000 10 DENSITIES

DENSITY	1.23166017+00	1.13442406-01	7.62045460-03	4.76815950-04	3.66331450-05	5,04203940-06	0.16042090-07	1.34750020-07
KAPPA(P)	2.72824770+04	2.60090520+04	2.34517300+04	1.07552600+04	0.44204600+03	2.11600900+03	3.72597960+02	5.63712670+01
KAPPA(R)	9.87019450+02	8.73361040+02	6.50360640+02	6.99705790+02	3.82955940+02	1.16125321+02	2,32733740+01	4,47609030+00

DENSITY	2.03415570-06	2.41105850-09
KAPPA(P)	6.67764320+00	1.66729739+00
KAPPA(R)	1.21268595+00	5.30003320-01

THETA = 1.65000 10 DENSITIES

DENSITY	3.00151280-01	3.39549710-02	2.59538610-03	2.41519580-04	3.37037990-05	6.04050150-06	1.06877227-06	1.67099560-07
KAPPA(P)	6.31141280+04	5.66643150+04	4.35733040+04	2.28601390+04	6.21107930+03	1.19971570+03	2.09979500+02	4.47007370+01
KAPPA(R)	4.46193410+03	3.57557040+03	2.92292450+03	1.56250990+03	4.94726900+02	1.17577767+02	2.97229640+01	1.01755721+01

DENSITY	2.04190600-06	2.06259730-09
KAPPA(P)	1.32409719+01	2.67504900+00
KAPPA(R)	3.76474440+00	9.40712600-01

THETA = 2,25000 10 DENSITIES

DENSITY	1.77692630-01	1.72927140-02	1.72402483-03	2.33184330-04	4.08830360-05	7.82560030-06	1.17007200-06	1.83030090-07
KAPPA(P)	9.90278070+04	7.81069610+04	4.86336190+04	1.73120820+04	4.30339040+03	1.00762380+03	2.01066100+02	7.97300900+01

KAPPA(R)	1.24923.70+04	1.01171772+04	6.28210190+03	2.52910290+03	6.95986300+02	2.36386920+02	8.61939470+01	2.28842740+01

DENSITY	1.99966730-08	2.47481590-09
KAPPA(P)	1.50133527+01	2.13962800+00
KAPPA(R)	3.73653980+00	6.65189040-01

THETA = 2.75000 10 DENSITIES

DENSITY	1.14246146-01	1.30435702-02	1.69690376-03	2.75528380-04	4.79879830-05	7.68607800-06	1.11684820-06	1.70658740-07
KAPPA(P)	1.21127018+05	7.81902270+04	3.97951330+04	1.54172140+04	4.86596290+03	1.53106670+03	3.73538878+02	6.94823060+01
KAPPA(R)	3.46845700+04	2.22545090+04	1.14106217+04	4.57311510+03	1.58072670+03	4.62492340+02	8.57417570+01	1.33347043+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 2.75600 CONTINUED

DENSITY	2.49672740-08	2.86356120-09
KAPPA(P)	1.04268916+01	1.96861252+00
KAPPA(R)	2.84160770+00	7.70564430-01

THETA = 3.40002 10 DENSITIES

DENSITY	9.54894040-02	1.28886270-02	1.94024699-03	3.11824520-04	4.83018880-05	7.97339710-06	1.33670902-06	2.84528820-07
KAPPA(P)	1.23871497+05	7.45853940+04	4.29890190+04	2.11710500+04	6.54037580+03	1.50016430+03	2.82647330+02	5.95603448+01
KAPPA(R)	6.88234020+04	3.91243360+04	1.54666180+04	6.62920380+03	1.55387950+03	2.75682540+02	6.07440990+01	1.75899890+01
DENSITY	2.65483640-08	3.11542580-09						
KAPPA(P)	1.27658631+01	2.15698840+00						
KAPPA(R)	4.15067650+00	7.98070770-01						

THETA = 5.00601 10 DENSITIES

DENSITY	9.30023960-02	1.49107922-02	2.25514720-03	3.56455920-04	6.04031120-05	1.02186098-05	1.64774991-06	2.53779540-07
KAPPA(P)	1.26033103+05	8.45839650+04	5.14980850+04	2.06791240+04	5.69645840+03	1.47548200+03	3.09531530+02	6.30368810+01
KAPPA(R)	9.35582660+04	4.74864610+04	1.51200941+04	4.51513310+03	1.50390440+03	4.16513940+02	8.80654220+01	1.80035680+01
DENSITY	3.43653600-08	4.07905700-09						
KAPPA(P)	1.17390391+01	1.82964506+00						
KAPPA(R)	3.45550980+00	7.24204830-01						

THETA = 7.00600 10 DENSITIES

DENSITY	1.04353615-01	1.69616560-02	2.69620520-03	4.37440450-04	7.35209670-05	1.27982775-05	2.07365848-06	3.18864400-07
KAPPA(P)	1.26155533+05	8.60255760+04	5.62071860+04	2.29207960+04	6.62198160+03	1.45799850+03	2.62295040+02	4.83990390+01
KAPPA(R)	9.17203680+04	4.98513070+04	2.19337100+04	6.95989690+03	1.69605450+03	4.23041370+02	9.32020710+01	1.71268948+01
DENSITY	4.42661730-08	5.45791040-09						
KAPPA(P)	9.29464510+00	1.45799614+00						
KAPPA(R)	2.83661680+00	5.80127710-01						

THETA = 10.00605 10 DENSITIES

DENSITY	1.25508730-01	2.09943900-02	3.39171360-03	5.62826040-04	9.57787270-05	1.60763050-05	2.82528880-06	4.59190830-07
KAPPA(P)	1.15832440+05	7.53651250+04	4.87275530+04	1.81034890+04	4.40656140+03	9.17176540+02	1.69730670+02	2.69933348+01
KAPPA(R)	6.89688310+04	4.95481360+04	2.28544230+04	7.31790960+03	1.83422980+03	3.73732380+02	6.43765848+01	1.88790662+01
DENSITY	6.80868920-08	6.87524430-09						
KAPPA(P)	4.14573450+00	7.10340390-01						
KAPPA(R)	1.65859687+00	4.01694670-01						

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 15.00000 10 DENSITIES

DENSITY	1.61364410-01	2.76654760-02	4.62000260-03	7.94077110-04	1.42759380-04	2.69184140-05	4.82596460-06	8.15144880-07
KAPPA(P)	8.66905280+04	5.92961670+04	3.34999750+04	9.23937920+03	1.95493060+03	3.52207310+02	5.61760180+01	8.61737040+00
KAPPA(R)	3.12539140+04	2.74906140+04	1.77187730+04	5.70307030+03	1.16217670+03	1.85113650+02	2.73282230+01	4.24066450+00

DENSITY	1.25244260-07	1.62788360-08
KAPPA(P)	1.40094057+00	3.53518310-01
KAPPA(R)	6.28197190-01	3.11981930-01

THETA = 22.50011 10 DENSITIES

DENSITY	2.29957680-01	4.02007350-02	7.04681180-03	1.28077495-03	2.45719480-04	4.82816010-05	8.81108550-06	1.49572430-06
KAPPA(P)	5.63647920+04	3.39620820+04	1.36836911+04	2.96564540+03	5.25804740+02	9.60952590+01	1.61322430+01	2.62915100+00
KAPPA(R)	1.01698209+04	7.95996580+03	4.89833180+03	1.72592770+03	3.65402670+02	6.66236720+01	1.11675246+01	1.88559229+00

DENSITY	2.30042960-07	2.98852780-08
KAPPA(P)	5.07352420-01	1.92451710-01
KAPPA(R)	4.29318160-01	1.87008720-01

THETA = 33.99998 11 DENSITIES

DENSITY	3.61815610-01	6.49290580-02	1.20081463-02	2.30033610-03	4.50316460-04	8.93026050-05	1.62161980-05	2.67160840-06
KAPPA(P)	2.65962290+04	1.28520672+04	3.68298890+03	7.51762120+02	1.39971660+02	2.63742980+01	5.37033330+00	1.49065555+00
KAPPA(R)	3.06991640+03	1.72074040+03	6.94255430+02	1.96505410+02	4.61104670+01	1.01548351+01	2.31135280+00	7.00060170-01

DENSITY	3.85818630-07	4.77159640-08	4.42011590-09
KAPPA(P)	5.42591600-01	2.65492150-01	2.12843100-01
KAPPA(R)	3.11961930-01	2.19524820-01	2.02066180-01

THETA = 49.99965 11 DENSITIES

DENSITY	5.85767100-01	1.09169889-01	2.05990570-02	3.93981680-03	7.64904190-04	1.43569690-04	2.47422060-05	3.90989559-06
KAPPA(P)	1.19890215+04	4.52906120+03	1.31332840+03	3.30960810+02	1.00148089+02	3.24655650+01	9.31457120+00	2.51571980+00
KAPPA(R)	1.52361330+03	6.08301090+02	1.93612730+02	5.12317760+01	1.39779345+01	4.15295440+00	1.34497576+00	5.20834890-01

DENSITY	5.72759460-07	7.26799820-08	7.17832410-09
KAPPA(P)	6.50124110-01	2.73632310-01	2.10693460-01
KAPPA(R)	2.71300620-01	2.11658750-01	2.00865450-01

THETA = 70.00033 11 DENSITIES

DENSITY	9.22436440-01	1.72375510-01	3.21948100-02	5.93995850-03	1.09835682-03	2.04431030-04	3.59457430-05	5.90853040-06
KAPPA(P)	8.82249400+03	3.43282890+03	1.17890340+03	3.89210360+02	1.20486770+02	3.37391860+01	7.51995360+00	1.51046564+00
KAPPA(R)	1.54285510+03	5.19008350+02	1.54979050+02	4.55900720+01	1.24450129+01	3.40649050+00	9.52457960-01	3.66667430-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 76.00033 CONTINUED

DENSITY	9.13940660-07	1.18672302-07	1.10646807-06
KAPPA(P)	4.07002680-01	2.29456910-01	2.05288290-01
KAPPA(R)	2.35143330-01	2.09504510-01	2.02333090-01

THETA = 99.99598 11 DENSITIES

DENSITY	1.47040517+00	2.67239500-01	4.82157260-02	8.84431800-03	1.67768572-03	3.27800960-04	5.97895320-05	1.01351606-05
KAPPA(P)	8.74292400+03	3.92907720+03	1.22840260+03	3.24566330+02	7.40166430+01	1.54701596+01	2.94594590+00	6.67372440-01
KAPPA(R)	2.24078450+03	7.41555460+02	2.11466240+02	5.04443100+01	1.01676385+01	2.06273540+00	5.86874070-01	3.15476830-01

DENSITY	1.55847939-06	2.02586280-07	2.02583250-08
KAPPA(P)	2.72512720-01	2.10434680-01	2.02699640-01
KAPPA(R)	2.44508440-01	2.09670080-01	2.00145630-01

THETA = 150.00069 11 DENSITIES

DENSITY	2.39295010+00	4.30671350-01	7.92966020-02	1.52371311-02	3.00171950-03	5.97710090-04	1.09681490-04	1.86157970-05
KAPPA(P)	6.29795830+03	2.26434300+03	5.85572450+02	1.21690099+02	2.44231140+01	4.94412490+00	1.05174794+00	3.36680790-01
KAPPA(R)	2.31255690+03	9.10888030+02	2.28777510+02	4.08431840+01	6.85105890+00	1.52713738+00	5.56070040-01	2.94239060-01

DENSITY	2.86311600-06	3.72175660-07	3.72170100-08
KAPPA(P)	2.16963550-01	2.04358390-01	2.02626680-01
KAPPA(R)	2.14516410-01	2.01235380-01	1.99580020-01

THETA = 224.99990 11 DENSITIES

DENSITY	3.97510630+00	7.32341740-01	1.40571360-01	2.76251140-02	5.49855490-03	1.09729193-03	2.01461960-04	3.41960650-05
KAPPA(P)	3.01625670+03	8.38957430+02	1.98229120+02	3.81257520+01	7.54503700+00	1.59388749+00	4.23921910-01	2.32668640-01
KAPPA(R)	6.67420010+02	2.62967360+02	7.25836690+01	1.56154371+01	3.22860440+00	7.77860550-01	3.06692390-01	2.17101570-01

DENSITY	5.25989470-06	6.83731910-07	6.83721780-08
KAPPA(P)	2.06720610-01	2.03217180-01	2.02764510-01
KAPPA(R)	2.01787520-01	1.99510180-01	1.99211140-01

THETA = 340.00448 11 DENSITIES

DENSITY	6.09265970+00	1.31239669+00	2.57552940-01	5.11685590-02	1.01981396-02	2.03709600-03	3.74121470-04	6.35241810-05
KAPPA(P)	9.35994630+02	2.52073300+02	5.48855420+01	1.13339199+01	2.34166440+00	5.70170770-01	2.55050600-01	2.00151310-01
KAPPA(R)	1.06578124+02	3.73080800+01	9.40846660+00	2.14001020+00	5.91471960-01	2.07477690-01	2.16921440-01	2.01100640-01

DENSITY	9.76994490-06	1.27011904-06	1.27010000-07
KAPPA(P)	2.01340650-01	2.00339870-01	2.00211690-01
KAPPA(R)	1.98158120-01	1.97696950-01	1.97641600-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 500.00094 11 DENSITIES

DENSITY	1.17994450+01	2.31348480+00	4.57455340-01	9.11909160-02	1.81784220-02	3.63073560-03	6.67027060-04	1.13285440-04
KAPPA(P)	3.52940680+02	6.90760030+01	1.93976120+01	3.92336610+00	8.90362140-01	3.11863400-01	2.16068450-01	2.00556350-01
KAPPA(R)	2.52642400+01	7.30734490+00	1.74220925+00	5.21146540-01	2.75532410-01	2.16821680-01	2.00753000-01	1.96543790-01
DENSITY	1.74233390-05	2.26508130-06	2.26504740-07					
KAPPA(P)	1.96267130-01	1.97922450-01	1.97876930-01					
KAPPA(R)	1.95765060-01	1.95641760-01	1.95624160-01					

THETA = 699.99976 9 DENSITIES

DENSITY	3.01105400-02	6.51349000-03	1.10469058-03	1.87657890-04	2.88615600-05	3.75208090-06	3.75202490-07	3.75196930-08
KAPPA(P)	4.17686130-01	2.29675000-01	2.00047590-01	1.95366110-01	1.94599820-01	1.94477270-01	1.94461710-01	1.94459760-01
KAPPA(R)	2.19542330-01	2.00570390-01	1.95319230-01	1.94098410-01	1.93877260-01	1.93840420-01	1.93836550-01	1.93834610-01
DENSITY	3.75191180-09							
KAPPA(P)	1.94459760-01							
KAPPA(R)	1.93834610-01							

THETA = 1000.00468 9 DENSITIES

DENSITY	5.13685060-02	1.02642324-02	1.88586254-03	3.20419340-04	4.92820850-05	6.40648380-06	6.40638890-07	6.40629480-08
KAPPA(P)	2.70974650-01	2.04319570-01	1.93762910-01	1.92144030-01	1.91867550-01	1.91825340-01	1.91819590-01	1.91819590-01
KAPPA(R)	2.01579790-01	1.94745820-01	1.92869780-01	1.92469030-01	1.92390140-01	1.92376670-01	1.92374740-01	1.92374740-01
DENSITY	6.40619760-09							
KAPPA(P)	1.91817660-01							
KAPPA(R)	1.92374740-01							

THETA = 1499.99930 9 DENSITIES

DENSITY	9.43456010-02	1.88547570-02	3.46442030-03	5.88649300-04	9.05371790-05	1.17694906-05	1.17693148-06	1.17691391-07
KAPPA(P)	2.20894120-01	1.96056770-01	1.91717950-01	1.90948780-01	1.90815170-01	1.90794180-01	1.90792280-01	1.90792280-01
KAPPA(R)	1.94420070-01	1.91976940-01	1.91340390-01	1.91271770-01	1.91250730-01	1.91246900-01	1.91244990-01	1.91244990-01
DENSITY	1.17689648-08							
KAPPA(P)	1.90790370-01							
KAPPA(R)	1.91244990-01							

THETA = 2250.01610 9 DENSITIES

DENSITY	1.73218240-01	3.46244360-02	6.36373300-03	1.08142028-03	1.66327070-04	2.16219840-05	2.16214620-06	2.16213410-07
KAPPA(P)	1.97282490-01	1.91401880-01	1.90342540-01	1.90142780-01	1.90108860-01	1.90102880-01	1.90102050-01	1.90102050-01
KAPPA(R)	1.92317040-01	1.91399960-01	1.91220130-01	1.91179980-01	1.91172320-01	1.91170420-01	1.91170420-01	1.91170420-01

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA =   2250.01010   CONTINUED

DENSITY	2.16210210-08
KAPPA(P)	1.90162650-01
KAPPA(R)	1.91170420-01

55 DIANE/SCAT ALLUVIUM-10 INPUT TAPES(4407,2000,3903) 11-7-67 CI/LN MATERL = 113A NX = 000

ONLY ABSORPTION COEFFICIENTS 24 TEMPERATURES

THETA = 1.50000 13 DENSITIES

DENSITY	2.44849630-02	2.90472050-02	2.98403150-03	3.36976300-04	3.84777670-05	5.17091980-06	7.74274040-07	1.10708280-07
KAPPA(P)	5.13774610+05	3.46126640+05	2.49132430+05	9.85766790+04	2.34154170+04	4.72095270+03	8.87287420+02	1.30374700+02
KAPPA(R)	1.80251780+05	1.27465367+05	6.51319170+04	2.14662010+04	5.01139690+03	1.12475890+03	2.12853250+02	3.00776300+01
DENSITY	1.79429270-08	2.29769400-09	2.51350770-10	2.13476420-11	1.72714740-12			
KAPPA(P)	1.76905550+01	2.26465720+00	3.52302180-01	1.02927339-01	5.85514750-02			
KAPPA(R)	3.81373490+00	5.21769740-01	1.18659936-01	6.03372280-02	5.37251000-02			

THETA = 2.25000 13 DENSITIES

DENSITY	1.16728905-01	1.46265050-02	1.67903514-03	2.28986390-04	3.76709990-05	6.91788830-06	1.18680003-06	1.72017450-07
KAPPA(P)	6.83771640+05	4.55545050+05	2.98465580+05	1.01470148+05	1.78122720+04	2.79122540+03	4.75008150+02	9.69493750+01
KAPPA(R)	5.09364020+05	2.88924260+05	1.24341848+05	3.55430490+04	7.34422800+03	1.20365250+03	1.90665190+02	3.40314120+01
DENSITY	2.10861910-08	2.63134700-09	2.92736030-10	2.89098140-11	2.43703280-12			
KAPPA(P)	1.77177250+01	2.43349980+00	3.59830570-01	9.80633100-02	7.14518130-02			
KAPPA(R)	5.31711640+00	7.42574250-01	1.56164080-01	7.45880490-02	6.83815640-02			

THETA = 3.40000 13 DENSITIES

DENSITY	8.56537740-02	1.22107937-02	1.87447066-03	3.10937700-04	5.16879990-05	8.62711880-06	1.42733711-06	2.22889440-07
KAPPA(P)	5.66096550+05	3.39184630+05	1.97940140+05	6.97791050+04	1.58718913+04	2.85581620+03	4.62020830+02	7.47542400+01
KAPPA(R)	4.75803380+05	2.85594960+05	1.24917647+05	3.49348410+04	6.91011050+03	1.21113820+03	1.90142340+02	2.90424910+01
DENSITY	3.07824650-08	3.63269950-09	4.14486860-10	4.26446210-11	3.66372830-12			
KAPPA(P)	1.16545420+01	1.68226079+00	2.65810670-01	9.79493280-02	8.50721990-02			
KAFPA(R)	4.38136050+00	6.59863290-01	1.51557930-01	8.58437950-02	8.27419950-02			

THETA = 5.60000 13 DENSITIES

DENSITY	9.03926790-02	1.51805852-02	2.40041660-03	3.87463470-04	6.67735210-05	1.17350558-05	1.93794990-06	3.11829290-07
KAPPA(P)	4.15002540+05	2.78048260+05	1.67548810+05	5.40065100+04	1.08229476+04	1.83917420+03	2.79488160+02	4.21206860+01
KAPPA(R)	3.41365600+05	2.23760140+05	1.04738280+05	2.98729870+04	5.40414720+03	8.37115440+02	1.25367690+02	1.83280360+01
DENSITY	4.49817110-08	5.41046920-09	6.11724060-10	6.05603940-11	5.38464370-12			
KAPPA(P)	7.25328680+00	1.16163870+00	2.20080700-01	1.11618107-01	1.01512534-01			
KAPPA(R)	2.86871560+00	4.81992070-01	1.45851250-01	1.02125787-01	9.91081130-02			

THETA = 7.00000 13 DENSITIES

DENSITY	1.08022038-01	1.84191020-02	3.01465770-03	5.07412160-04	8.81743960-05	1.61130670-05	2.71977910-06	4.33480080-07
KAPPA(P)	3.04169370+05	2.11096350+05	1.19699530+05	3.32081300+04	6.07024330+03	1.02290506+03	1.72275850+02	2.93985980+01
KAPPA(R)	2.08626010+05	1.54697970+05	7.31501850+04	1.86403880+04	2.77679860+03	4.59500460+02	8.12833320+01	1.31981542+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 7.00000 CONTINUED

DENSITY	6.21795420-06	7.56290970-09	8.30319980-10	8.10139380-11	7.40474710-12
KAPPA(P)	5.32659930+00	6.63697140-01	2.07926420-01	1.29485420-01	1.21230570-01
KAPPA(R)	2.08251540+00	3.72981740-01	1.51257090-01	1.22323879-01	1.18696554-01

THETA = 10.00000 13 DENSITIES

DENSITY	1.40382130-01	2.42735980-02	4.07865500-03	7.07515520-04	1.25235710-04	2.28685050-05	3.06175070-06	6.03336990-07
KAPPA(P)	2.12832020+05	1.47047360+05	7.69768430+04	2.03792170+04	3.82310030+03	7.00569090+02	1.23097911+02	2.24303500+01
KAPPA(R)	1.20905977+05	9.22216300+04	3.[illegible]+04	9.06549650+03	1.66071070+03	2.99005560+02	5.12780600+01	8.01079260+00
DENSITY	8.54008390-08	1.06690388-08	1.21737387-09	1.26821570-10	1.16318981-11			
KAPPA(P)	4.00961400+00	6.65767950-01	1.93841400-01	1.34279070-01	1.31086350-01			
KAPPA(R)	1.45681695+00	3.06753430-01	1.51975800-01	1.28933690-01	1.28741850-01			

THETA = 15.00000 13 DENSITIES

DENSITY	1.93620730-01	3.45468120-02	5.94434480-03	1.04135142-03	1.83582930-04	3.32708140-05	5.73312390-06	9.39206950-07
KAPPA(P)	1.35698390+05	9.51995010+04	4.44419860+04	1.13563682+04	2.11735080+03	3.77057600+02	6.29021070+01	1.06177592+01
KAPPA(R)	8.42816680+04	5.74557240+04	2.44858320+04	6.34372400+03	1.16682300+03	1.90628590+02	2.82311700+01	4.30804140+00
DENSITY	1.40473060-07	1.77645700-06	2.03123900-09	2.10345440-10	1.92319150-11			
KAPPA(P)	1.78804652+00	3.63376420-01	1.67016110-01	1.44376030-01	1.45258840-01			
KAPPA(R)	6.25365060-01	2.39042240-01	1.54648800-01	1.41710070-01	1.42636900-01			

THETA = 22.49999 13 DENSITIES

DENSITY	2.93266650-01	5.02109570-02	8.71795040-03	1.54022163-03	2.81927110-04	5.35933810-05	9.50141330-06	1.56355270-06
KAPPA(P)	9.33396640+04	6.35835440+04	2.48350160+04	5.61578090+03	1.03651450+03	1.04746370+02	3.20992870+01	6.00610010+00
KAPPA(R)	5.92266070+04	4.05913340+04	1.71151090+04	3.80722130+03	5.89307410+02	9.55321600+01	1.64105750+01	2.71960590+00
DENSITY	2.33015710-07	2.93272140-08	3.34145400-09	3.44161580-10	3.14947630-11			
KAPPA(P)	1.10421640+00	2.87873250-01	1.71635370-01	1.60242010-01	1.62730470-01			
KAPPA(R)	5.54683630-01	2.21968670-01	1.63783480-01	1.56979030-01	1.59738530-01			

THETA = 33.99998 13 DENSITIES

DENSITY	4.26860020-01	7.59262090-02	1.35662257-02	2.49733030-03	4.70001350-04	8.90599790-05	1.58954130-05	2.60765300-06
KAPPA(P)	5.86595620+04	3.71611780+04	1.40417307+04	3.35713320+03	5.63635040+02	1.02147610+02	1.00600690+01	3.59722600+00
KAPPA(R)	2.61231950+04	2.09187230+04	8.84681590+03	1.90811840+03	3.25224910+02	5.37557140+01	9.03709220+00	1.72934210+00
DENSITY	3.88291140-07	4.90787360-08	5.58875200-09	5.70304950-10	5.22730690-11			
KAPPA(P)	7.51971760-01	2.49205600-01	1.81714230-01	1.78610510-01	1.82005930-01			
KAPPA(R)	4.25600660-01	2.03172680-01	1.72953070-01	1.74696170-01	1.78684600-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 50.00000 13 DENSITIES

DENSITY	6.52368030-01	1.19955313-01	2.19763150-02	4.11935370-03	7.78968480-04	1.48844580-04	2.62233590-05	4.25902630-06
KAPPA(P)	2.49455000+04	1.13710500+04	4.06741470+03	9.43615690+02	2.28635710+02	5.38844520+01	1.09164080+01	2.26156960+00
KAPPA(R)	1.03437104+04	6.35175790+03	2.53813020+03	5.48001480+02	1.19967986+02	2.47053790+01	4.62448020+00	9.00354500-01
DENSITY	6.32067310-07	7.90907460-06	9.06994320-09	9.58099500-10	8.99380650-11			
KAPPA(P)	5.51215740-01	2.42241290-01	1.94982950-01	1.88877230-01	1.88562450-01			
KAPPA(R)	3.01037930-01	2.02118930-01	1.88130010-01	1.85235920-01	1.85128520-01			

THETA = 69.99998 13 DENSITIES

DENSITY	9.82621150-01	1.80661990-01	3.34227650-02	6.27083380-03	1.17386335-03	2.22054000-04	3.91625370-05	6.44168800-06
KAPPA(P)	1.30651798+04	6.27080460+03	2.14536500+03	5.25497760+02	1.38647110+02	3.23517130+01	7.01289070+00	1.48640327+00
KAPPA(R)	6.18483060+03	3.70147590+03	1.42974720+03	3.13266090+02	6.62764710+01	1.19067797+01	2.27797680+00	5.66977520-01
DENSITY	9.77908250-07	1.26535880-07	1.48359900-08	1.57011024-09	1.47223420-10			
KAPPA(P)	3.97947180-01	2.16649590-01	1.92697240-01	1.90389940-01	1.90765750-01			
KAPPA(R)	2.62921970-01	2.00195280-01	1.88668650-01	1.87145850-01	1.87330280-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.55864276+00	2.62546370-01	5.17074710-02	9.58358090-03	1.81048052-03	3.50691740-04	6.36637010-05	1.07629597-05
KAPPA(P)	8.92735910+03	4.32292230+03	1.36745410+03	3.26684530+02	7.58321970+01	1.65875430+01	3.34536220+00	7.25914170-01
KAPPA(R)	4.55051160+03	2.67444440+03	9.01863150+02	1.85075890+02	3.34604110+01	6.11766800+00	1.22337898+00	3.98430700-01
DENSITY	1.64349139-06	2.13429350-07	2.50120070-08	2.63261070-09	2.43245520-10			
KAPPA(P)	2.72410000-01	2.02088410-01	1.93119320-01	1.93681730-01	1.97128790-01			
KAPPA(R)	2.33704210-01	1.98663270-01	1.90160060-01	1.90206490-01	1.93539050-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.55366070+00	4.63977930-01	8.56485490-02	1.62699240-02	3.18195030-03	6.30369110-04	1.15130141-04	[illegible].93931620-05
KAPPA(P)	6.02158550+03	2.60822180+03	6.71995740+02	1.45613950+02	3.02865870+01	6.34640800+00	1.37983772+00	4.20822510-01
KAPPA(R)	2.66462590+03	1.48486470+03	4.49013510+02	8.86213650+01	1.54216596+01	3.17871170+00	8.06724860-01	3.28939320-01
DENSITY	2.93304360-06	3.74123470-07	4.34654300-08	4.60547560-09	4.33313410-10			
KAPPA(P)	2.41480390-01	2.07766380-01	2.03595773-01	2.03320850-01	2.03282830-01			
KAPPA(R)	2.22914940-01	2.01462100-01	1.99694220-01	1.99595390-01	1.99583220-01			

THETA = 224.99990 13 DENSITIES

DENSITY	4.24256900+00	7.85754790-01	1.49364290-01	2.90611220-02	5.70568070-03	1.11875700-03	2.01878410-04	3.39517580-05
KAPPA(P)	3.04871630+03	9.56170220+02	2.12847720+02	5.07012700+01	1.28773115+01	3.59187730+00	1.00376011+00	3.55281510-01
KAPPA(R)	1.17636440+03	5.42645890+02	1.54245800+02	3.57314040+01	7.68800240+00	1.73404668+00	5.00595750-01	2.61718610-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99998 CONTINUED

DENSITY	5.20792640-06	6.76671460-07	7.96033410-08	8.45777380-09	7.96025580-10
KAPPA(P)	2.27071560-01	2.06359800-01	2.03642760-01	2.03317190-01	2.03282220-01
KAPPA(R)	2.11740070-01	2.02196960-01	2.00204080-01	1.99658070-01	1.99580820-01

THETA = 340.00012 13 DENSITIES

DENSITY	7.31696050+00	1.38803558+00	2.67914690-01	5.17932730-02	1.01552753-02	2.01586680-03	3.69841520-04	6.28485310-05
KAPPA(P)	1.38690000+03	3.92396170+02	1.12380674+02	3.04478680+01	7.40412280+00	1.71281667+00	4.80348210-01	2.56390150-01
KAPPA(R)	5.66499370+02	2.16204980+02	6.84878920+01	1.53361836+01	3.13172190+00	7.81943720-01	3.28860710-01	2.33826280-01
DENSITY	9.60837650-06	1.25686505-06	1.47859990-07	1.57052620-08	1.47619226-09			
KAPPA(P)	2.10468770-01	2.04210490-01	2.03396900-01	2.03362130-01	2.03621580-01			
KAPPA(R)	2.08231460-01	2.00958970-01	1.99749930-01	1.99661070-01	1.99909800-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.24303356+01	2.37112080+00	4.59805880-01	9.03905110-02	1.79648180-02	3.58767830-03	6.59257090-04	1.12039619-04
KAPPA(P)	6.74428750+02	2.42849060+02	6.22127500+01	1.37032081+01	2.88283440+00	7.32366940-01	2.99580830-01	2.19909100-01
KAPPA(R)	2.81651020+02	1.30496700+02	3.42786930+01	6.98698390+00	1.53108845+00	5.08336270-01	2.76426580-01	2.15888330-01
DENSITY	1.72203490-05	2.23497620-06	2.62556380-07	2.78835240-08	2.62417340-09			
KAPPA(P)	2.06221460-01	2.04268290-01	2.04218450-01	2.04263790-01	2.04270940-01			
KAPPA(R)	2.02476380-01	2.00516650-01	2.00494390-01	2.00543110-01	2.00546930-01			

THETA = 699.99976 13 DENSITIES

DENSITY	1.97766600+01	3.83807130+00	7.52576060-01	1.49214560-01	2.97265700-02	5.93610570-03	1.08944162-03	1.84922640-04
KAPPA(P)	3.81631490+02	1.05067285+02	2.43022500+01	5.04009020+00	1.19965016+00	4.18000850-01	2.48564470-01	2.12839690-01
KAPPA(R)	1.12753467+02	4.70054690+01	1.22804060+01	2.71459450+00	7.48770830-01	3.31990470-01	2.29341980-01	2.06426050-01
DENSITY	2.84278000-05	3.69500030-06	4.34695560-07	4.61859610-08	4.34691290-09			
KAPPA(P)	2.05670480-01	2.04433610-01	2.04287690-01	2.04273600-01	2.04272170-01			
KAPPA(R)	2.01403460-01	2.00756210-01	2.00565580-01	2.00549730-01	2.00548130-01			

THETA = 999.99967 13 DENSITIES

DENSITY	3.30795110+01	6.40028190+00	1.27982914+00	2.54153720-01	5.06054510-02	1.01024731-02	1.85588432-03	3.15455160-04
KAPPA(P)	1.57107402+02	3.91434450+01	8.69855560+00	2.08704670+00	6.54060710-01	3.08116590-01	2.22756950-01	2.07010030-01
KAPPA(R)	3.79945970+01	1.42875134+01	3.69891670+00	9.92690140-01	4.05468010-01	2.58027780-01	2.14505260-01	2.02978950-01
DENSITY	4.85303120-05	6.30889530-06	7.42227580-07	7.88617240-08	7.42227800-09			
KAPPA(P)	2.04635680-01	2.04316500-01	2.04276670-01	2.04271960-01	2.04271550-01			
KAPPA(R)	2.00831100-01	2.00577620-01	2.00548930-01	2.00545520-01	2.00545120-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1499.99430 13 DENSITIES

DENSITY	5.99423910+01	1.12261831+01	2.34112780+00	4.65381760-01	9.27996900-02	1.85476710-02	3.40899750-03	5.79513270-04
KAPPA(P)	6.37506250+01	1.53306177+01	3.94880500+00	1.03248815+00	3.73620420-01	2.34677900-01	2.09193210-01	2.05050910-01
KAPPA(R)	1.46347957+01	5.88945810+00	1.76092597+00	5.77109750-01	2.94640080-01	2.10753440-01	2.03268190-01	2.00929740-01
DENSITY	8.91554040-05	1.15902087-05	1.36354860-06	1.44877110-07	1.36354885-08			
KAPPA(P)	2.04376390-01	2.04270120-01	2.04256040-01	2.04254400-01	2.04254200-01			
KAPPA(R)	2.00568230-01	2.00511030-01	2.00503410-01	2.00502610-01	2.00502410-01			

THETA = 2249.99070 13 DENSITIES

DENSITY	1.09262029+02	2.15644900+01	4.27604270+00	8.53630030-01	1.70449530-01	3.40726250-02	6.26268040-03	1.06463319-03
KAPPA(P)	2.68351030+01	7.05858070+00	1.70752677+00	4.90340310-01	2.55283390-01	2.13668610-01	2.05729510-01	2.04252760-01
KAPPA(R)	4.26161410+00	1.84842438+00	6.35800530-01	2.95400120-01	2.18966390-01	2.04050650-01	2.00840140-01	2.00204280-01
DENSITY	1.63789090-04	2.12926220-05	2.50500480-06	2.66156870-07	2.50500520-08			
KAPPA(P)	2.03996180-01	2.03956200-01	2.03951100-01	2.03950490-01	2.03950290-01			
KAPPA(R)	2.00092630-01	2.00074990-01	2.00072800-01	2.00072590-01	2.00072390-01			

THETA = 3400.00050 13 DENSITIES

DENSITY	2.00559300+02	3.97895760+01	7.93821140+00	1.58542481+00	3.16609860-01	6.32917060-02	1.16333305-02	1.97762630-03
KAPPA(P)	9.06383190+00	2.23059920+00	5.47923350-01	2.75738310-01	2.17303130-01	2.05149970-01	2.02698830-01	2.02277240-01
KAPPA(R)	9.35507950-01	4.30445910-01	2.63133970-01	2.14625630-01	2.02647350-01	1.99335280-01	1.98566740-01	1.98438110-01
DENSITY	3.04249030-04	3.95525660-05	4.65322540-06	4.94405410-07	4.65322680-08			
KAPPA(P)	2.02440350-01	2.02429010-01	2.02427600-01	2.02427390-01	2.02427390-01			
KAPPA(R)	1.98571910-01	1.98568530-01	1.98568130-01	1.98568130-01	1.98567930-01			

THETA = 4999.99070 13 DENSITIES

DENSITY	3.56965090+02	7.09079790+01	1.41535057+01	2.82573920+00	5.64618550-01	1.12870960-01	2.07463080-02	3.52680120-03
KAPPA(P)	4.25606140+00	1.04596650+00	3.59620400-01	2.28796110-01	2.64816660-01	2.00196080-01	1.99253370-01	1.98994910-01
KAPPA(R)	4.06308030-01	2.58169460-01	2.15015320-01	2.01500580-01	1.97412860-01	1.96370120-01	1.96132850-01	1.96121680-01
DENSITY	5.42582720-04	7.05357480-05	8.29829970-06	8.81694710-07	8.29830220-08			
KAPPA(P)	1.98964870-01	1.98960100-01	1.98959500-01	1.98959500-01	1.98959500-01			
KAPPA(R)	1.96114030-01	1.96112850-01	1.96112660-01	1.96112660-01	1.96112660-01			

THETA = 6999.99090 13 DENSITIES

DENSITY	5.90758890+02	1.17417144+02	2.34431653+01	4.68072480+00	9.35205640-01	1.86970760-01	3.43662950-02	5.84215240-03
KAPPA(P)	2.16789590+00	5.67110780-01	2.64044660-01	2.09308710-01	1.98720290-01	1.96639140-01	1.96211520-01	1.96131290-01
KAPPA(R)	2.05572600-01	2.19491450-01	2.01594900-01	1.96430620-01	1.94775820-01	1.94369170-01	1.94278230-01	1.94260930-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 6999.99690 CONTINUED

DENSITY	8.96790140-04	1.16842581-04	1.37461740-05	1.46053187-06	1.37461770-07
KAPPA(P)	1.96117560-01	1.96115200-01	1.96115010-01	1.96115010-01	1.96115010-01
KAPPA(R)	1.94257630-01	1.94257440-01	1.94257240-01	1.94257240-01	1.94257240-01

THETA = 9999.99520 13 DENSITIES

DENSITY	1.00811541+03	2.00448220+02	3.99845420+01	7.99204740+00	1.59696458+00	3.19246410-01	5.86793790-02	9.97530280-03
KAPPA(P)	1.01468034+00	3.41623510-01	2.17700500-01	1.96276400-01	1.88417690-01	1.88172530-01	1.88131140-01	1.88123430-01
KAPPA(R)	2.30029400-01	2.02259450-01	1.94450820-01	1.92347430-01	1.91089180-01	1.90978200-01	1.90962720-01	1.90959860-01
DENSITY	1.53465606-03	1.99505270-04	2.34711160-05	2.49380790-06	2.34711200-07			
KAPPA(P)	1.88122110-01	1.88121730-01	1.88121730-01	1.88121730-01	1.88121730-01			
KAPPA(R)	1.90959490-01	1.90959290-01	1.90959100-01	1.90959100-01	1.90959100-01			

1050301 DIANE ALUMINUM 3A -- 12 FREQUENCIES -- OCTOBER 15, 1965 MATERL = 1013 NX = 998

GREY ABSORPTION COEFFICIENTS 25 TEMPERATURES

THETA = .10000 17 DENSITIES

DENSITY	2.70000060+00	8.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815780-03	2.70000940-03	8.53811640-04
KAPPA(P)	1.40531550-16	1.40531550-16	1.40531550-16	1.40531550-16	1.40531550-16	1.40531560-16	1.40531550-16	1.40531550-16
KAPPA(R)	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011850-07	8.53846130-08
KAPPA(P)	1.40531550-16	1.40531550-16	1.40531550-16	1.40531550-16	1.40531550-16	1.40531550-16	1.40531550-16	1.40531550-16
KAPPA(R)	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18	6.43680190-18
DENSITY	2.70007650-08							
KAPPA(P)	1.40531550-16							
KAPPA(R)	6.43680190-18							

THETA = .20000 17 DENSITIES

DENSITY	2.70000060+00	8.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815780-03	2.70000940-03	8.53811640-04
KAPPA(P)	1.81120140-04	1.81120140-04	1.81120140-04	1.81120140-04	1.81120140-04	1.81120140-04	1.81120140-04	1.81120140-04
KAPPA(R)	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011850-07	8.53846130-08
KAPPA(P)	1.81120140-04	1.81120140-04	1.81120140-04	1.81120140-04	1.81118330-04	1.81116520-04	1.81112890-04	1.81107470-04
KAPPA(R)	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05	1.58063310-05	1.58047500-05
DENSITY	2.70007650-08							
KAPPA(P)	1.81098400-04							
KAPPA(R)	1.58047500-05							

THETA = .30000 17 DENSITIES

DENSITY	2.70000060+00	8.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815790-03	2.70000940-03	8.53811640-04
KAPPA(P)	1.17047423+00	1.17047187+00	1.17046837+00	1.17046134+00	1.17044844+00	1.17042623+00	1.17038644+00	1.17031621+00
KAPPA(R)	1.50563550-01	1.50563550-01	1.50563550-01	1.50562050-01	[illegible]	1.50557530-01	1.50553010-01	1.50543980-01
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011850-07	8.53846130-08
KAPPA(P)	1.17019100+00	1.16996869+00	1.16957330+00	1.16887059+00	1.16762050+00	1.16540303+00	1.16146947+00	1.15450766+00
KAPPA(R)	1.50527420-01	1.50498820-01	1.50447660-01	1.50357420-01	1.50198630-01	1.49911520-01	1.49405670-01	1.48510440-01
DENSITY	2.70007850-08							
KAPPA(P)	1.14223657+00							
KAPPA(R)	1.46931520-01							

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = .40000 17 DENSITIES

DENSITY	2.70000060+00	8.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815700-03	2.70000940-03	8.53811640-04
KAPPA(P)	7.29489570+01	7.29467850+01	7.29431170+01	7.29365530+01	7.29246850+01	7.29037430+01	7.28672980+01	7.28010190+01
KAPPA(R)	1.23964615+01	1.23980595+01	1.23974399+01	1.23963241+01	1.23943407+01	1.23908708+01	1.23849532+01	1.23734119+01
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011850-07	8.53846130-08
KAPPA(P)	7.26846290+01	7.24770480+01	7.21105210+01	7.14622950+01	7.03244780+01	6.83457900+01	6.49657330+01	5.93753960+01
KAPPA(R)	1.23535468+01	1.23183493+01	1.22559310+01	1.21457579+01	1.19523744+01	1.16160757+01	1.10416002+01	1.00910645+01
DENSITY	2.70007650-08							
KAPPA(P)	5.06530760+01							
KAPPA(R)	8.80901560+00							

THETA = .50000 17 DENSITIES

DENSITY	2.70000060+00	8.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815780-03	2.70000940-03	8.53811640-04
KAPPA(P)	7.48080020+02	7.47967840+02	7.47765910+02	7.47414510+02	7.46779510+02	7.45652700+02	7.43657030+02	7.40125660+02
KAPPA(R)	1.58046600+02	1.58022900+02	1.57960230+02	1.57904420+02	1.57771840+02	1.57533790+02	1.57112180+02	1.56366000+02
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011050-07	8.53848130-08
KAPPA(P)	7.33803670+02	7.22906550+02	7.03804030+02	6.71087810+02	6.16729150+02	5.31206820+02	4.09423450+02	2.64224720+02
KAPPA(R)	1.55047650+02	1.52728210+02	1.48692430+02	1.41780470+02	1.30296160+02	1.12227714+02	8.64987510+01	5.58221050+01
DENSITY	2.70007650-08							
KAPPA(P)	1.34393620+02							
KAPPA(R)	2.83932080+01							

THETA = .60000 17 DENSITIES

DENSITY	2.70000060+00	8.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815780-03	2.70000940-03	8.53811640-04
KAPPA(P)	3.19224550+03	3.19074580+03	3.18809840+03	3.18338360+03	3.17502230+03	3.16016610+03	3.13398260+03	3.08791050+03
KAPPA(R)	8.06835660+02	8.06464570+02	8.05787420+02	8.04595750+02	8.02482440+02	7.98735570+02	7.92109750+02	7.80465070+02
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011850-07	8.53846130-08
KAPPA(P)	3.00766660+03	2.87020850+03	2.64149900+03	2.28891040+03	1.76539530+03	1.14656980+03	5.87566010+02	2.38046220+02
KAPPA(R)	7.80191620+02	7.25441140+02	8.67633880+02	5.76496880+02	4.46201210+02	2.89793890+02	1.48508170+02	8.03680490+01
DENSITY	2.70007650-08							
KAPPA(P)	8.36699540+01							
KAPPA(R)	2.11478740+01							

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = .70000 17 DENSITIES

DENSITY	2.70000060+00	6.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815780-03	2.70000940-03	8.53811640-04
KAPPA(P)	8.37251790+03	6.36356390+03	8.34760510+03	8.31943720+03	8.26942240+03	8.18124740+03	8.02686970+03	7.75947470+03
KAPPA(R)	2.46910240+03	2.46643710+03	2.46175540+03	2.45342420+03	2.43867450+03	2.41269570+03	2.36714520+03	2.28828970+03
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011850-07	8.53846130-08
KAPPA(P)	7.30628030+03	6.56698360+03	5.44247930+03	3.93572310+03	2.31598400+03	1.06537260+03	4.00863100+02	1.35346748+02
KAPPA(R)	2.15464230+03	1.93664030+03	1.60500150+03	1.16065520+03	6.82989820+02	3.14178070+02	1.18213221+02	3.99113190+01
DENSITY	2.70007650-06							
KAPPA(P)	4.37713710+01							
KAPPA(R)	1.29054537+01							

THETA = .80000 17 DENSITIES

DENSITY	2.70000060+00	6.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815780-03	2.70000940-03	8.53811640-04
KAPPA(P)	1.63519085+04	1.63189111+04	1.62662686+04	1.61566972+04	1.59740367+04	1.56545981+04	1.51021128+04	1.41685493+04
KAPPA(R)	5.54002230+03	5.52904260+03	5.50917380+03	5.47408250+03	5.41224860+03	5.30396480+03	5.11677670+03	4.80047410+03
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011850-07	8.53846130-08
KAPPA(P)	1.28537031+04	1.03720493+04	7.36813550+03	4.23115370+03	1.90013450+03	7.04289820+02	2.36377460+02	7.64166030+01
KAPPA(R)	4.28724050+03	3.51417460+03	2.49638740+03	1.43352250+03	6.43736820+02	2.38564550+02	8.00282690+01	2.58290540+01
DENSITY	2.70007650-08							
KAPPA(P)	2.45028030+01							
KAPPA(R)	8.23917310+00							

THETA = .90000 17 DENSITIES

DENSITY	2.70000060+00	8.53814770-01	2.70000900-01	8.53811440-02	2.69999570-02	8.53815780-03	2.70000940-03	8.53811640-04
KAPPA(P)	2.63467420+04	2.62599420+04	2.61028540+04	2.58276250+04	2.53466010+04	2.45140080+04	2.31092780+04	2.07913000+04
KAPPA(R)	1.01786735+04	1.01446317+04	1.00845505+04	9.97841900+03	9.79247880+03	9.47052780+03	8.92427120+03	8.03232960+03
DENSITY	2.69999650-04	8.53815990-05	2.69992910-05	8.53786220-06	2.69988880-06	8.53773490-07	2.70011850-07	8.53846130-08
KAPPA(P)	1.72719050+04	1.25387601+04	7.41092830+03	3.43258843+03	1.29771440+03	4.40539450+02	1.44271930+02	4.77563410+01
KAPPA(R)	6.67263370+03	4.84401870+03	2.86587780+03	1.32570530+03	5.00811590+02	1.69585960+02	5.50862420+01	1.77753020+01
DENSITY	2.70007650-08							
KAPPA(P)	1.71678010+01							
KAPPA(R)	5.93863400+00							

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1.00000 11 DENSITIES

DENSITY	1.70892000-01	2.00136640-02	1.78050193-03	1.77629630-04	2.51111160-05	4.50968968-06	8.04850048-07	1.33420510-07
KAPPA(P)	4.94807470+04	4.25825560+04	3.41972290+04	1.98092300+04	6.24439750+03	1.27512560+03	2.23900100+02	4.19829330+01
KAPPA(R)	9.21520290+03	7.03167290+03	5.68814790+03	3.10063800+03	1.00272030+03	2.51607410+02	4.40135250+01	8.60230330+00
DENSITY	1.84426490-08	1.75886017-09	1.67992020-10					
KAPPA(P)	1.06575051+01	3.35227760+00	5.97536440-01					
KAPPA(R)	2.40520940+00	7.05229500-01	1.44910340-01					

THETA = 1.50000 11 DENSITIES

DENSITY	7.76524440-02	9.79767660-03	1.30135402-03	2.12204550-04	3.00427558-05	6.39752100-06	8.99804070-07	1.30982780-07
KAPPA(P)	8.15278000+04	5.20000500+04	2.82514460+04	1.26769405+04	4.90563568+03	1.69724210+03	4.65707720+02	9.30391110+01
KAPPA(R)	4.74674720+04	3.15774930+04	1.77734310+04	7.13722910+03	2.30900860+03	7.75299940+02	2.11104030+02	3.79929250+01
DENSITY	1.91033940-08	2.26045470-09	2.18092900-10					
KAPPA(P)	1.42165954+01	2.39089440+00	4.38144410-01					
KAPPA(R)	5.76760700+00	9.02994330-01	1.76077680-01					

THETA = 2.25000 11 DENSITIES

DENSITY	7.29019430-02	1.07401098-02	1.68341638-03	2.63412330-04	4.18424170-05	7.29515590-06	1.16475476-06	1.68000338-07
KAPPA(P)	7.61758000+04	4.94540860+04	3.42828310+04	2.20595280+04	7.91060200+03	1.04857420+03	4.04224320+02	8.11265250+01
KAPPA(R)	4.80068960+04	3.36914690+04	2.04696780+04	1.12525488+04	4.40894170+03	1.15910090+03	2.49218490+02	4.04145550+01
DENSITY	2.40483420-08	3.08042000-09	3.51666010-10					
KAPPA(P)	1.23266056+01	1.52070035+00	2.08367900-01					
KAPPA(R)	5.22487040+00	6.45227700-01	1.24574660-01					

THETA = 3.40002 11 DENSITIES

DENSITY	8.71791590-02	1.36250756-02	2.09695290-03	3.31709850-04	5.46435160-05	9.66402860-06	1.69979998-06	2.06078400-07
KAPPA(P)	6.78530090+04	4.69575820+04	3.56248920+04	2.05757800+04	6.09479200+03	1.16303970+03	1.00337470+02	2.65630160+01
KAPPA(R)	3.53375000+04	3.14766090+04	2.57554090+04	1.40950636+04	4.27679800+03	8.35783780+02	1.26321466+02	1.77626860+01
DENSITY	4.39266480-08	5.70912540-09	6.71639080-10					
KAPPA(P)	3.73807200+00	4.97261110-01	9.60928860-02					
KAPPA(R)	2.41569730+00	3.41700730-01	8.53265200-02					

THETA = 5.00001 11 DENSITIES

DENSITY	1.14333005-01	1.79343040-02	2.80374300-03	4.64880590-04	8.46318500-05	1.64349570-05	2.99939510-06	5.09110000-07
KAPPA(P)	5.01914480+04	3.45720190+04	2.26836570+04	8.99541130+03	1.96815130+03	3.45405250+02	5.57075090+01	8.54229740+00
KAPPA(R)	1.38731409+04	1.17556583+04	8.20697670+03	3.64579570+03	9.02254020+02	2.02103500+02	3.48753390+01	5.48644220+00

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00001 CONTINUED

DENSITY	7.82388600-08	1.01053597-08	1.13605988-09
KAPPA(P)	1.22305597+00	1.99861620-01	7.28516560-02
KAPPA(R)	8.46807400-01	1.61266010-01	6.56206960-02

THETA = 7.00000 11 DENSITIES

DENSITY	1.55545030-01	2.50400180-02	4.11770220-03	7.23304700-04	1.37226190-04	2.69588220-05	4.84773000-06	7.64992420-07
KAPPA(P)	2.85467960+04	1.72888990+04	9.03231540+03	2.95918740+03	6.20173910+02	1.20045396+02	2.35011640+01	5.74207510+00
KAPPA(R)	4.35536020+03	2.89777920+03	1.53520610+03	5.63676200+02	1.50645580+02	3.80670850+01	1.00909261+01	3.55309830+00

DENSITY	1.03883066-07	1.26197855-08	1.37873438-09
KAPPA(P)	1.39676960+00	2.77107430-01	1.01751673-01
KAPPA(R)	6.82993600-01	1.93292630-01	8.71678260-02

THETA = 10.00005 11 DENSITIES

DENSITY	2.35887360-01	3.91858320-02	6.50373440-03	1.16366589-03	2.08560800-04	3.70812170-05	6.25831200-06	9.67258590-07
KAPPA(P)	1.53939513+04	6.98426490+03	4.65743390+03	1.76726770+03	5.46842040+02	1.77634840+02	3.80659420+01	7.63094860+00
KAPPA(R)	1.74566340+03	9.75041430+02	4.81752240+02	2.30423730+02	1.12830869+02	4.54733280+01	1.36470037+01	3.54919200+00

DENSITY	1.35417950-07	1.62902360-00	1.74327589-09
KAPPA(P)	1.53905099+00	3.29038660-01	1.25407390-01
KAPPA(R)	7.54842620-01	1.94525890-01	1.07250292-01

THETA = 15.00000 11 DENSITIES

DENSITY	3.61082670-01	5.85227330-02	9.71464670-03	1.64361047-03	2.84729760-04	5.08403630-05	8.4368[illegible]0-06	1.30958537-06
KAPPA(P)	1.30532175+04	9.02216830+03	5.94811700+03	2.14486080+03	6.37930880+02	1.71261210+02	4.0053[illegible]+01	8.21843650+00
KAPPA(R)	1.61004410+03	6.90987110+02	6.36069940+02	3.78474970+02	1.59599890+02	5.42135020+01	1.53353403+01	3.49100910+00

DENSITY	1.84263330-07	2.20599970-00	2.38539770-09
KAPPA(P)	1.62226265+00	3.59507580-01	1.58844430-01
KAPPA(R)	7.07165180-01	2.14436840-01	1.36550610-01

THETA = 22.50011 11 DENSITIES

DENSITY	4.67714120-01	7.99303230-02	1.36090540-02	2.29629120-03	3.94532120-04	6.99982730-05	1.16139920-05	1.79968310-06
KAPPA(P)	1.45990992+04	9.11220390+03	5.70301100+03	2.33507650+03	7.33670450+02	1.79878210+02	4.18616440+01	1.01329296+01
KAPPA(R)	3.60363630+03	1.80122000+03	9.42108050+02	4.50109090+02	1.88280880+02	6.16060420+01	1.50382955+01	3.16249090+00

DENSITY	2.53957450-07	3.04189550-00	3.33197770-09
KAPPA(P)	1.09050358+00	3.84929140-01	1.88433520-01
KAPPA(R)	6.91347970-01	2.40749090-01	1.70547740-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 35.99998 10 DENSITIES

DENSITY	5.80553060-01	1.03608697-01	1.77439620-02	3.09818760-03	5.40703820-04	9.88657190-05	1.65506010-05	2.60987040-06
KAPPA(P)	2.43019040+04	1.50860230+04	7.90420170+03	2.41045530+03	6.41193960+02	1.55920610+02	3.05277150+01	6.09206240+00
KAPPA(R)	1.37306793+04	6.52928650+03	2.52010510+03	8.14650310+02	2.33549710+02	5.06624590+01	1.15094563+01	2.10054150+00
DENSITY	3.84131650-07	4.93351120-08						
KAPPA(P)	1.13576655+00	2.91713540-01						
KAPPA(R)	4.69097230-01	2.08451470-01						

THETA = 50.00000 10 DENSITIES

DENSITY	8.32171670-01	1.44756820-01	2.49885390-02	4.39870980-03	7.91082160-04	1.47359860-04	2.81700330-05	4.40143500-06
KAPPA(P)	1.89923040+04	1.24116016+04	5.08736300+03	1.50364420+03	3.53662010+02	7.00743750+01	1.25589428+01	2.20140230+00
KAPPA(R)	9.79597570+03	6.28624980+03	2.67921460+03	7.99470750+02	1.70724470+02	2.91412000+01	4.59419730+00	8.53513090-01
DENSITY	6.75563970-07	8.70056600-08						
KAPPA(P)	4.77236450-01	2.04825270-01						
KAPPA(R)	2.83105080-01	1.87104870-01						

THETA = 69.99998 10 DENSITIES

DENSITY	1.14990900+00	1.99817260-01	3.50670970-02	6.35031430-03	1.20061104-03	2.35148020-04	4.29493130-05	7.27876050-06
KAPPA(P)	1.44607153+04	9.56262860+03	3.45416110+03	7.90510500+02	1.40561340+02	2.69199050+01	4.72517210+00	9.11181370-01
KAPPA(R)	4.87344750+03	3.78188910+03	1.95501460+03	4.92040360+02	7.58053580+01	1.21270921+01	1.95252633+00	4.91380160-01
DENSITY	1.11094977-06	1.45444680-07						
KAPPA(P)	2.78493100-01	1.79774670-01						
KAPPA(R)	2.40063360-01	1.77692990-01						

THETA = 99.99998 10 DENSITIES

DENSITY	1.64406732+00	2.97558450-01	5.40658790-02	1.02623237-02	2.01081330-03	3.99501910-04	7.32220560-05	1.24222676-05
KAPPA(P)	8.99321760+03	5.48106100+03	1.52269330+03	2.74680600+02	5.06736460+01	9.53405370+00	1.81006565+00	4.44866690-01
KAPPA(R)	1.67274950+03	1.16709600+03	5.11750880+02	1.35906610+02	2.70361540+01	4.91141450+00	1.03231394+00	3.41691840-01
DENSITY	1.90663632-06	2.44982260-07						
KAPPA(P)	2.10929150-01	1.75514960-01						
KAPPA(R)	1.97666300-01	1.69865380-01						

THETA = 149.99995 10 DENSITIES

DENSITY	2.73960570+00	5.02313630-01	9.47805570-02	1.85847480-02	3.67271170-03	7.25631710-04	1.29593100-04	2.09825380-05
KAPPA(P)	4.18229500+03	1.77154080+03	4.23838690+02	7.97921370+01	1.64012090+01	4.15977500+00	1.48382309+00	5.72605540-01
KAPPA(R)	4.05483330+02	1.79349368+00	8.53964115+00	1.90537500+01	4.53089090+00	1.24133019+00	4.67833080-01	2.55224430-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	3.07320590-06	3.88555450-07
KAPPA(P)	2.94798260-01	2.11936200-01
KAPPA(R)	2.0[illegible]3620-01	1.93298040-01

THETA = 224.99990 10 DENSITIES

DENSITY	4.60203210+00	8.62662330-01	1.70160360-01	3.27691910-02	6.22727770-03	1.18471622-03	2.11227460-04	3.55667270-05
KAPPA(P)	1.65719200+03	5.71963940+02	1.68152610+02	5.31154570+01	1.87145250+01	5.71935470+00	1.45933723+00	4.24107500-01
KAPPA(R)	2.49423430+02	6.80944860+01	2.73653600+01	7.24067170+00	2.15797540+00	7.40905100-01	3.40268930-01	2.27164690-01

DENSITY	5.45793560-06	7.09241390-07
KAPPA(P)	2.31151620-01	1.99711590-01
KAPPA(R)	2.01313470-01	1.95448760-01

THETA = 699.99976 4 DENSITIES

DENSITY	7.91224430-01	1.56805360-01	3.12251940-02	6.23728710-03
KAPPA(P)	3.22146670+01	6.78626010+00	1.51332162+00	4.08052270-01
KAPPA(R)	1.15605676+01	2.37506540+00	6.22305590-01	2.77681630-01

52 JIANE/SCAT AL-103 TEMP(1.-7000.EV) 10 FREQ. CI/WBL 10-26-67 MATERL = 3013 NX = 943

GREY ABSORPTION COEFFICIENTS 23 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	1.69120630-01	1.96609050-02	1.76698254-03	1.74294100-04	2.49242340-05	4.47604830-06	7.90900040-07	1.32443470-07
KAPPA(P)	7.93858040+05	6.58773070+05	5.07564050+05	1.24738342+05	2.03132560+04	2.74630900+03	4.10169200+02	7.04731620+01
KAPPA(R)	1.56363760+05	1.26386505+05	7.97952990+04	2.79161300+04	5.23498030+03	6.50021040+02	7.37836350+01	1.10714006+01
DENSITY	1.83114390-08	1.74662616-09	1.66759260-10	1.70169710-11	1.58105340-12			
KAPPA(P)	1.59866442+01	4.47580840+00	7.60949320-01	1.11836870-01	3.83167560-02			
KAPPA(R)	2.82306160+00	5.01550100-01	1.57864690-01	5.11299930-02	3.39506250-02			

THETA = 1.50000 13 DENSITIES

DENSITY	7.30293170-02	9.61303800-03	1.28460891-03	2.10277620-04	3.77494390-05	6.35117990-06	8.93392300-07	1.30023500-07
KAPPA(P)	7.17467230+05	5.15942160+05	2.59048340+05	7.11168790+04	1.61487177+04	3.75209640+03	7.75301320+02	1.43100620+02
KAPPA(R)	4.78140530+05	3.34837260+05	1.40623330+05	3.46412320+04	6.74861070+03	1.46271990+03	2.91574610+02	4.73644040+01
DENSITY	1.84608400-08	2.24374410-09	2.16479510-10	2.10510640-11	1.95609710-12			
KAPPA(P)	2.09449540+01	3.20461190+00	5.50400610-01	1.09321521-01	5.12980470-02			
KAPPA(R)	6.76514400+00	1.03248444+00	1.99458870-01	6.67116550-02	4.85023020-02			

THETA = 2.25000 13 DENSITIES

DENSITY	6.53896700-02	1.05407496-02	1.66526173-03	2.61341910-04	4.15326830-05	7.24144410-06	1.15612116-06	1.66743350-07
KAPPA(P)	5.34197600+05	3.22223270+05	1.99300650+05	1.13039200+05	2.77399790+04	4.01120310+03	7.69841750+02	1.14013020+02
KAPPA(R)	2.79380300+05	2.26046740+05	1.19159701+05	4.13960170+04	9.34172190+03	1.46705940+03	3.62984080+02	5.25918480+01
DENSITY	2.36696630-08	3.05746410-09	3.55963680-10	3.01303790-11	3.50863260-12			
KAPPA(P)	1.51301579+01	1.76540574+00	2.35625700-01	6.48004320-02	4.69280340-02			
KAPPA(R)	5.04835960+00	7.00902140-01	1.29531266-01	5.74443870-02	4.62458290-02			

THETA = 3.40000 13 DENSITIES

DENSITY	7.74791610-02	1.29069806-02	2.08421500-03	3.29237560-04	5.42375540-05	9.59258740-06	1.60714976-06	2.83937900-07
KAPPA(P)	3.75250610+05	2.53700540+05	1.09618590+05	7.19034810+04	1.39218459+04	1.80842700+03	2.30073030+02	3.14565420+01
KAPPA(R)	9.87058960+04	9.12063640+04	6.83707220+04	2.95139900+04	7.00964910+03	1.14247690+03	1.52763190+02	2.81225600+01
DENSITY	4.30012510-08	5.66646750-09	6.66614000-10	7.08270580-11	6.66560080-12			
KAPPA(P)	4.31785170+00	5.64632040-01	1.03574512-01	5.09297010-02	4.54852580-02			
KAPPA(R)	2.64490930+00	3.65761540-01	8.90595520-02	5.07089930-02	4.49968400-02			

THETA = 5.00000 13 DENSITIES

DENSITY	9.55459500-02	1.71717270-02	2.77031580-03	4.61425020-04	8.40027550-05	1.63132990-05	2.97716220-06	5.05316990-07
KAPPA(P)	1.96356250+05	1.40947100+05	8.07012990+04	1.99702290+04	3.00477770+03	4.55763480+02	6.70611300+01	9.92474348+00
KAPPA(R)	3.13299550+04	2.48069493+04	1.51206097+04	5.83964270+03	1.42710030+03	2.73790970+02	4.47747330+01	6.78200780+00

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	7.76557680-08	1.00299541-06	1.12763886-09	1.03905448-10	9.01141630-12			
KAPPA(P)	1.40032100+00	2.24113870-01	7.77141440-02	6.12440240-02	6.01325490-02			
KAPPA(R)	1.00811387+00	1.81287520-01	6.98303190-02	5.84364180-02	5.90237130-02			

THETA = 7.00000 13 DENSITIES

DENSITY	1.24562087-01	2.34755930-02	3.95715490-03	7.17936840-04	1.36206300-04	2.67581890-05	4.81189330-06	7.59261200-07
KAPPA(P)	1.07649932+05	6.35822700+04	2.76013490+04	5.53593600+03	9.56385390+02	1.75216600+02	3.32989530+01	7.69008020+00
KAPPA(R)	1.51049521+04	6.72478390+03	4.02010740+03	1.17664080+03	2.97807090+02	7.02561570+01	1.73882540+01	4.73469820+00
DENSITY	1.05107697-07	1.25261192-06	1.36851455-09	1.30090590-10	1.16571676-11			
KAPPA(P)	1.78504876+00	3.35221420-01	1.10539318-01	7.97483680-02	7.66817930-02			
KAPPA(R)	1.04155436+00	2.10847950-01	8.98948160-02	7.59429140-02	7.54005280-02			

THETA = 10.00000 13 DENSITIES

DENSITY	1.82709650-01	3.41620460-02	6.24998030-03	1.15530952-03	2.06661780-04	3.67493530-05	6.20050800-06	9.59983290-07
KAPPA(P)	1.34773580+05	7.08627330+04	2.25573590+04	5.61088600+03	1.30488980+03	3.14872240+02	5.89840450+01	1.04844582+01
KAPPA(R)	1.09354438+04	4.51327770+03	2.00673640+03	7.74372470+02	3.09908469+02	9.63783830+01	2.12962280+01	4.43380430+00
DENSITY	1.34403420-07	1.61691940-08	1.72983496-09	1.72347220-10	1.48519490-11			
KAPPA(P)	1.90784614+00	3.76239640-01	1.31582400-01	9.91406220-02	1.02469918-01			
KAPPA(R)	8.40589620-01	2.02864300-01	1.08768664-01	9.55854180-02	1.00814811-01			

THETA = 15.00000 13 DENSITIES

DENSITY	2.85015700-01	5.34384910-02	9.15923160-03	1.58592885-03	2.79243890-04	5.02672930-05	8.36503520-06	1.29830639-06
KAPPA(P)	2.32182720+05	1.42143150+05	4.23316330+04	9.09481640+03	1.58502580+03	2.68858960+02	5.11276770+01	9.67257898+00
KAPPA(R)	1.82465990+04	8.81621530+03	4.82569700+03	1.74518350+03	4.24769200+02	8.97313290+01	1.94688350+01	3.08960260+00
DENSITY	1.92594440-07	2.18638790-08	2.36532590-09	2.33310740-10	2.04225820-11			
KAPPA(P)	1.80160496+00	3.88291750-01	1.61982660-01	1.32353620-01	1.36503360-01			
KAPPA(R)	7.46401409-01	2.17608440-01	1.36697340-01	1.28310260-01	1.34470430-01			

THETA = 22.49999 13 DENSITIES

DENSITY	3.96836740-01	7.35205000-02	1.25930776-02	2.14920680-03	3.84363440-04	6.89568920-05	1.14939481-05	1.78471834-06
KAPPA(P)	2.29527590+05	1.13438937+05	2.61052030+04	5.45177210+03	1.17856500+03	2.23122940+02	4.55794050+01	1.067215[illegible]+01
KAPPA(R)	4.82335390+04	2.41780380+04	9.90276120+03	1.93108630+03	3.30368920+02	7.27208350+01	1.62223500+01	3.24[illegible]+00
DENSITY	2.52037600-07	3.01934760-08	3.30718010-09	3.33592800-10	3.09973320-11			
KAPPA(P)	1.99748618+00	3.94807690-01	1.89471050-01	1.66669910-01	1.64849230-01			
KAPPA(R)	6.96375450-01	2.41817730-01	1.70705480-01	1.62904840-01	1.62370910-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 39.99998 13 DENSITIES

DENSITY	5.75743620-01	1.02791459-01	1.75928440-02	3.07219820-03	5.40958490-04	9.75605860-05	1.63099870-05	2.58886750-06
KAPPA(P)	1.06610762+05	5.39462190+04	1.21003656+04	2.79698400+03	7.02625470+02	1.66875650+02	3.20683950+01	6.22079050+00
KAPPA(R)	3.65431610+04	2.27167980+04	5.95063900+03	1.05950380+03	2.68340300+02	6.42085870+01	1.22272055+01	2.13764090+00
DENSITY	3.81231470-07	4.89674550-08	5.75055220-09	6.10862140-10	5.74911650-11			
KAPPA(P)	1.14377693+00	2.91781510-01	1.79253550-01	1.66170490-01	1.64777700-01			
KAPPA(R)	4.71018550-01	2.08695080-01	1.69261400-01	1.63725990-01	1.62235620-01			

THETA = 50.00000 13 DENSITIES

DENSITY	8.25393030-01	1.43522280-01	2.47884860-02	4.36627510-03	7.81492510-04	1.45473450-04	2.58945000-05	4.36957010-06
KAPPA(P)	3.81762490+04	1.79813240+04	5.83544580+03	1.62354770+03	3.80657470+02	7.41701630+01	1.28401005+01	2.21266230+00
KAPPA(R)	1.49170618+04	1.00536602+04	3.26865850+03	8.53811090+02	1.87972370+02	3.13927010+01	4.79127710+00	8.02722500-01
DENSITY	6.70568530-07	8.71513320-08	1.02527509-08	1.04935524-09	1.02527327-10			
KAPPA(P)	4.77332400-01	2.04190680-01	1.69136700-01	1.65120790-01	1.64692860-01			
KAPPA(R)	2.83794490-01	1.87255170-01	1.68054320-01	1.63171090-01	1.62471120-01			

THETA = 69.99998 13 DENSITIES

DENSITY	1.14911498+00	1.98253280-01	3.48048330-02	6.31098210-03	1.18624787-03	2.32426620-04	4.25109070-05	7.21960750-06
KAPPA(P)	1.80089650+04	1.06140404+04	3.66943500+03	8.14846660+02	1.51173010+02	2.71162170+01	4.76927020+00	9.13711700-01
KAPPA(R)	5.90197270+03	4.37863320+03	2.10470150+03	5.10761600+02	7.96355770+01	1.20527070+01	1.97063046+00	4.95074310-01
DENSITY	1.11050629-06	1.44360820-07	1.69833930-08	1.80421568-09	1.69540410-10			
KAPPA(P)	2.78022010-01	1.79195300-01	1.66440060-01	1.64968780-01	1.65068950-01			
KAPPA(R)	2.40669410-01	1.77689620-01	1.64423640-01	1.62394810-01	1.62640960-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.67097583+00	2.95342670-01	5.36637790-02	1.01059800-02	1.99015650-03	3.95177710-04	7.25213920-05	1.23214377-05
KAPPA(P)	1.01247464+04	5.88362250+03	1.58231450+03	2.00153860+02	5.10759110+01	9.64692290+00	1.03130016+00	4.46430030-01
KAPPA(R)	1.86832190+03	1.26247950+03	5.37233580+02	1.40054550+02	2.73015380+01	4.90000040+00	1.05173205+00	3.44191190-01
DENSITY	1.89225752-06	2.43156660-07	2.74173490-08	2.77102140-09	2.48962220-10			
KAPPA(P)	2.10874940-01	1.75247680-01	1.76527780-01	1.83960360-01	1.92322430-01			
KAPPA(R)	1.98129440-01	1.69880000-01	1.72470680-01	1.80601920-01	1.89088900-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.71916610+00	4.98576620-01	9.40765000-02	1.84467330-02	3.63922240-03	7.18305200-04	1.28390520-04	2.08097280-05
KAPPA(P)	4.46142720+03	1.88072930+03	4.35339850+02	8.11329320+01	1.68150270+01	4.22418770+00	1.42801532+00	5.75499110-01
KAPPA(R)	5.21066650+02	2.54610000+02	8.14433710+01	1.94162430+01	4.67438680+00	1.26357194+00	4.73320460-01	2.55303790-01

GRET ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	3.04984460-06	3.85656030-07	4.51150530-08	4.79002620-09	4.50789880-10
KAPPA(P)	2.94134240-01	2.11951460-01	1.97514360-01	1.95701440-01	1.95505060-01
KAPPA(R)	2.01695730-01	1.93250690-01	1.92121360-01	1.91971760-01	1.91871580-01

THETA = 224.99990 13 DENSITIES

DENSITY	4.56779420+00	6.76296740-01	1.68920350-01	3.25069290-02	6.16220270-03	1.17281201-03	2.09306260-04	3.52605120-05
KAPPA(P)	1.75063320+03	5.97781290+02	1.70402620+02	5.32898020+01	1.90095780+01	5.82350310+00	1.47727[illegible]+00	4.28168570-01
KAPPA(R)	2.64595470+02	9.19712440+01	2.61854810+01	7.46691540+00	2.22613230+00	7.51499900-01	3.41812820-01	2.28299030-01
DENSITY	5.41655790-06	7.03956040-07	8.28147260-08	8.79906820-09	8.28147400-10			
KAPPA(P)	2.31622350-01	2.00228110-01	1.96282570-01	1.96010110-01	1.95996000-01			
KAPPA(R)	2.01297770-01	1.95430790-01	1.92437660-01	1.92044720-01	1.92031470-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.35481497+01	2.53356840+00	4.82882410-01	9.41447300-02	1.86933950-02	3.73260100-03	6.85902570-04	1.16595719-04
KAPPA(P)	1.00477702+03	3.53986580+02	8.28153960+01	1.84147310+01	3.84847120+00	9.07136980-01	3.09234920-01	2.10489610-01
KAPPA(R)	3.33458070+02	1.20438827+02	2.80776800+01	5.09492010+00	1.20061831+00	4.56204640-01	2.55302290-01	2.02984260-01
DENSITY	1.79376270-05	2.33189340-06	2.74339360-07	2.91485720-08	2.74339440-09			
KAPPA(P)	1.99814670-01	1.98700620-01	1.98558990-01	1.98542120-01	1.98540330-01			
KAPPA(R)	1.96239490-01	1.95628850-01	1.95551980-01	1.95542600-01	1.95541620-01			

THETA = 699.99976 13 DENSITIES

DENSITY	2.12972720+01	4.04030420+00	7.85335860-01	1.55322450-01	3.09371670-02	6.10187310-03	1.13615780-03	1.93139070-04
KAPPA(P)	5.43267590+02	1.55349110+02	3.28088720+01	6.76285400+00	1.51035936+00	4.11165320-01	2.25147840-01	2.02506770-01
KAPPA(R)	1.41102410+02	5.06081170+01	1.16596013+01	2.32292710+00	6.13773200-01	2.77125440-01	2.00145480-01	1.90011930-01
DENSITY	2.97137720-05	3.86275490-06	4.54444520-07	4.82847560-08	4.54444650-09			
KAPPA(P)	1.99898610-01	1.99526140-01	1.99477070-01	1.99471080-01	1.99470480-01			
KAPPA(R)	1.96845720-01	1.96696560-01	1.96676700-01	1.96674340-01	1.96673940-01			

THETA = 999.99967 13 DENSITIES

DENSITY	3.51560590+01	6.79008860+00	1.33457541+00	2.64909510-01	5.28108840-02	1.05547952-02	1.93993465-03	3.29779940-04
KAPPA(P)	2.39413060+02	5.77960240+01	1.25902283+01	2.56809760+00	6.22724670-01	2.62655240-01	2.07423430-01	1.99987100-01
KAPPA(R)	3.25370450+01	9.41966470+00	2.37229650+00	6.31351450-01	2.91336010-01	2.15216450-01	1.99137440-01	1.96590190-01
DENSITY	5.07350640-05	6.59558590-06	7.75940330-07	8.24445550-08	7.75940550-09			
KAPPA(P)	1.98802780-01	1.98617780-01	1.98596530-01	1.98593940-01	1.98593790-01			
KAPPA(R)	1.96154420-01	1.96085010-01	1.96078140-01	1.96077350-01	1.96077350-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1499.99930 13 DENSITIES

DENSITY	6.33517760+01	1.22707572+01	2.43709870+00	4.86451480-01	9.70099250-02	1.93090770-02	3.56307940-03	6.85000020-04
KAPPA(P)	8.63906650+01	2.07007920+01	4.37748330+00	9.73094630-01	3.27502360-01	2.17509440-01	1.99743550-01	1.96093950-01
KAPPA(R)	6.40391160+00	1.76322513+00	5.43728460-01	2.78477780-01	2.16282030-01	1.99661070-01	1.95507800-01	1.94703770-01
DENSITY	9.32063250-05	1.21167713-05	1.42551137-06	1.51460650-07	1.42551162-08			
KAPPA(P)	1.96402920-01	1.96325350-01	1.96314950-01	1.96313780-01	1.96313570-01			
KAPPA(R)	1.94550790-01	1.94526080-01	1.94522780-01	1.94522390-01	1.94522390-01			

THETA = 2249.99070 13 DENSITIES

DENSITY	1.12971172+02	2.24831240+01	4.47393780+00	8.93494860-01	1.78210470-01	3.56213180-02	6.54724470-03	1.11300503-03
KAPPA(P)	3.26921160+01	7.22119890+00	1.64033795+00	4.43869400-01	2.34753090-01	2.00591450-01	1.94775240-01	1.93763100-01
KAPPA(R)	1.63865510+00	5.31743420-01	2.22502180-01	2.14464870-01	1.99172500-01	1.94342930-01	1.93150540-01	1.92927260-01
DENSITY	1.71231020-04	2.22599840-05	2.61883760-06	2.78248860-07	2.61883840-08			
KAPPA(P)	1.93587050-01	1.93559170-01	1.93555500-01	1.93555110-01	1.93555110-01			
KAPPA(R)	1.92884250-01	1.92877310-01	1.92876340-01	1.92876150-01	1.92876150-01			

THETA = 3400.00050 13 DENSITIES

DENSITY	2.09122240+02	4.17105030+01	8.30761010+00	1.65718203+00	3.31029760-01	6.61686160-02	1.21619263-02	2.06740170-03
KAPPA(P)	5.46027410+00	1.25969848+00	3.73009040-01	2.15155560-01	1.91752650-01	1.88629220-01	1.88119660-01	1.88041990-01
KAPPA(R)	4.39128450-01	2.56615350-01	2.09152420-01	1.95828500-01	1.92077170-01	1.91167740-01	1.90949740-01	1.90920340-01
DENSITY	3.18072400-04	4.13495110-05	4.86462990-06	5.16867150-07	4.86463130-08			
KAPPA(P)	1.88028450-01	1.88026380-01	1.88026190-01	1.88026000-01	1.88026000-01			
KAPPA(R)	1.90915600-01	1.90914030-01	1.90914030-01	1.90914030-01	1.90914030-01			

THETA = 4999.99070 13 DENSITIES

DENSITY	3.72295910+02	7.43373060+01	1.48126563+01	2.95518710+00	5.90334060-01	1.18001492-01	2.16809580-02	3.68704500-03
KAPPA(P)	2.65282390+00	6.58523100-01	2.62316630-01	1.98270890-01	1.89460260-01	1.88226920-01	1.88034270-01	1.87998930-01
KAPPA(R)	3.19824440-01	2.26158990-01	2.00682540-01	1.93406320-01	1.91448770-01	1.91001880-01	1.90930840-01	1.90916900-01
DENSITY	5.67235500-04	7.37406050-05	8.67539230-06	9.21760930-07	8.67539590-08			
KAPPA(P)	1.87992720-01	1.87991780-01	1.87991600-01	1.87991600-01	1.87991600-01			
KAPPA(R)	1.90914420-01	1.90914030-01	1.90914030-01	1.90914030-01	1.90914030-01			

THETA = 6999.99090 13 DENSITIES

DENSITY	6.16162020+02	1.23099501+02	2.44713240+01	4.89514050+00	9.77882490-01	1.95469480-01	3.59277960-02	6.18759640-03
KAPPA(P)	1.42826938+00	4.06735370-01	2.20741260-01	1.92455170-01	1.88678260-01	1.88087690-01	1.87992160-01	1.87974300-01
KAPPA(R)	2.64924070-01	2.11442750-01	1.96544770-01	1.92290120-01	1.91213820-01	1.90959100-01	1.90922630-01	1.90915300-01

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA =   6999.99690   CONTINUED

DENSITY	9.39626600-04	1.22151440-04	1.43706884-05	1.52688629-06	1.43706910-07
KAPPA(P)	1.87971290-01	1.87970740-01	1.87970740-01	1.87970740-01	1.87970740-01
KAPPA(R)	1.90914230-01	1.90914030-01	1.90914030-01	1.90914030-01	1.90914030-01

7 GIANE/SCAT BE(HI/LO)-2 10 FREQ. TEMP(1.-2250.) CI/JP 12-9-66 000000 MATERL = 1004 NX = 061

GREY ABSORPTION COEFFICIENTS 21 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	1.62409540-02	1.84363040-02	1.43322087-03	1.05590304-04	1.05555377-05	1.59352834-06	2.70920760-07	4.40905310-08
KAPPA(P)	2.09461520+05	1.96005860+05	1.62060750+05	1.15364265+05	4.02232270+04	7.01188560+03	1.09431390+03	1.81621510+02
KAPPA(R)	7.37156420+04	6.65913470+04	5.68544590+04	3.73508100+04	1.40367048+04	2.81765420+03	3.95105960+02	5.54501600+01
DENSITY	6.50106530-09	6.59268900-10	5.80921630-11	5.71989900-12	5.33301300-13			
KAPPA(P)	3.52128440+01	9.26267200+00	1.96335390+00	3.09774700-01	1.10755525-01			
KAPPA(R)	1.05314012+01	2.57002470+00	5.26361600-01	1.51621800-01	9.71952920-02			

THETA = 1.50000 13 DENSITIES

DENSITY	3.67113250-02	4.59943870-03	5.30221960-04	7.56024440-05	1.32832063-05	2.35481130-06	3.38067620-07	4.56542130-08
KAPPA(P)	4.66072450+05	3.40726070+05	2.26819520+05	1.12955576+05	3.02723470+04	7.34762920+03	1.67729550+03	3.14977110+02
KAPPA(R)	3.23075660+05	2.46611600+05	1.38514450+05	4.63242050+04	1.18546193+04	2.92653370+03	6.54694650+02	1.10632206+02
DENSITY	6.50594210-09	6.33709790-10	9.79024040-11	1.03996400-11	9.78769820-13			
KAPPA(P)	4.72974210+01	5.93272110+00	7.53715670-01	1.57384250-01	9.61781590-02			
KAPPA(R)	1.44604415+01	1.73054379+00	2.63760130-01	1.15455859-01	9.30847420-02			

THETA = 2.25000 13 DENSITIES

DENSITY	2.72233440-02	4.34445920-03	6.34491940-04	9.90146250-05	1.53086900-05	2.61271680-06	4.55837290-07	7.66091000-08
KAPPA(P)	3.10061440+05	3.56443110+05	2.88321050+05	1.43040040+05	3.30220230+04	5.01713280+03	6.82471630+02	9.93059990+01
KAPPA(R)	2.73120520+05	2.40657300+05	1.53977220+05	5.70292700+04	1.30326054+04	2.09435930+03	2.83593240+02	3.72360350+01
DENSITY	1.17614260-08	1.52646816-09	1.79811890-10	1.91048310-11	1.79810130-12			
KAPPA(P)	1.41567280+01	1.77985392+00	2.75373470-01	1.09321084-01	9.18435210-02			
KAPPA(R)	4.82434200+00	6.66887610-01	1.79856490-01	1.06346142-01	9.07842010-02			

THETA = 3.40000 13 DENSITIES

DENSITY	3.27569650-02	5.12910550-03	6.06719940-04	1.29587670-04	2.35319870-05	4.57899980-06	8.36323930-07	1.41992730-07
KAPPA(P)	3.94214210+05	2.65717830+05	1.59768290+05	4.73342760+04	8.05355540+03	1.24709100+03	1.89122690+02	2.09575210+01
KAPPA(R)	4.15911530+04	7.83115120+04	4.64174140+04	1.77113500+04	3.98606140+03	7.19806190+02	1.13392922+02	1.65823020+01
DENSITY	2.16400660-09	2.63909700-09	3.34010050-10	3.54885930-11	3.34010120-12			
KAPPA(P)	2.20902600+00	6.00859760-01	1.48787970-01	9.62226030-02	9.05679400-02			
KAPPA(R)	2.37997600+00	4.61346870-01	1.36110660-01	9.42053950-02	8.89104140-02			

THETA = 5.00000 13 DENSITIES

DENSITY	4.31768420-02	6.97711360-03	1.18364810-03	2.13992220-04	4.10430130-05	8.12414560-06	1.48996193-06	2.53178790-07
KAPPA(P)	2.13916490+05	1.17678305+05	4.53261720+04	1.21349605+04	2.15622860+03	3.57057540+02	5.73665250+01	9.13256840+00
KAPPA(R)	2.42948260+04	1.43061979+04	6.34793520+03	1.91390110+03	4.61327380+02	9.83646980+01	1.85077570+01	3.30475710+00

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	3.89475510-08	5.06308430-09	5.95636810-10	6.32668260-11	5.93480660-12
KAPPA(P)	1.43228969+00	2.60479520-01	1.10540024-01	9.21669200-02	9.05338020-02
KAPPA(R)	6.45949790-01	1.81897300-01	1.02009738-01	8.99011100-02	8.88211040-02

THETA = 7.00000 13 DENSITIES

DENSITY	5.57549540-02	1.03565928-02	1.85421107-03	3.48052930-04	6.76669960-05	1.34431624-05	2.46736450-06	4.19131990-07
KAPPA(P)	1.02921001+05	4.10682210+04	1.41374547+04	3.28071240+03	6.26404250+02	1.15349072+02	1.99405620+01	3.37054790+00
KAPPA(R)	7.86633360+03	3.37227170+03	1.20182670+03	3.26494130+02	7.63404530+01	1.64883810+01	3.34029450+00	7.64167850-01
DENSITY	6.42765460-08	8.16646260-09	8.48221030-10	7.43453520-11	6.61970760-12			
KAPPA(P)	6.30469120-01	2.07407880-01	1.49238140-01	1.37584630-01	1.35326760-01			
KAPPA(R)	2.54460410-01	1.33511450-01	1.15301826-01	1.27317790-01	1.31992390-01			

THETA = 10.00000 13 DENSITIES

DENSITY	6.87110360-02	1.67567520-02	3.09122140-03	5.69353130-04	1.14979352-04	2.26409580-05	3.96184790-06	5.82789420-07
KAPPA(P)	5.46513080+04	1.91198620+04	5.26216020+03	1.22555480+03	2.69537880+02	6.49837960+01	2.11372090+01	8.80361100+00
KAPPA(R)	3.01927770+03	1.10019520+03	3.46615790+02	8.98925410+01	2.22113400+01	6.48421650+00	2.76669090+00	1.30147664+00
DENSITY	7.73890460-08	9.56638980-09	1.07735177-09	9.98661850-11	8.55769700-12			
KAPPA(P)	2.39282910+00	4.88455450-01	1.99724570-01	1.74680270-01	1.78941910-01			
KAPPA(R)	4.58130040-01	1.97777230-01	1.49767970-01	1.60779890-01	1.74277570-01			

THETA = 15.00000 13 DENSITIES

DENSITY	1.55902570-01	2.81416670-02	5.32831120-03	9.90650300-04	1.69590810-04	2.96995110-05	5.08991230-06	7.90223560-07
KAPPA(P)	2.29077370+04	1.28477750+04	4.84496300+03	1.70289650+03	6.24569720+02	1.79183240+02	4.15907990+01	1.07851153+01
KAPPA(R)	1.58578360+03	6.15763490+02	2.17720240+02	9.61533140+01	4.41135940+01	1.39515832+01	3.91793990+00	1.40763176+00
DENSITY	1.07509455-07	1.32820825-08	1.54938162-09	1.64449100-10	1.54758570-11			
KAPPA(P)	2.76624550+00	5.74236240-01	2.27466360-01	1.85027090-01	1.80449920-01			
KAPPA(R)	4.92833640-01	2.34558090-01	1.84176820-01	1.77675400-01	1.76957090-01			

THETA = 22.49999 13 DENSITIES

DENSITY	2.41987550-01	4.48194990-02	7.68294800-03	1.32733514-03	2.36979490-04	4.21675350-05	7.26080480-06	1.21381697-06
KAPPA(P)	4.07128640+04	2.56161940+04	8.79861990+03	2.35235430+03	6.35807580+02	1.72231230+02	3.71372290+01	6.73608560+00
KAPPA(R)	4.06450790+03	1.81610970+03	7.51414130+02	2.44650090+02	7.13313510+01	1.86835780+01	3.84734880+00	7.72480360-01
DENSITY	1.86005440-07	2.41679130-08	2.84307450-09	3.02073770-10	2.84304660-11			
KAPPA(P)	1.12848.23+00	3.02595300-01	1.93824920-01	1.81141280-01	1.88305790-01			
KAPPA(R)	2.87815570-01	1.99703000-01	1.83684620-01	1.78379130-01	1.77428950-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 33.99998 13 DENSITIES

DENSITY	3.70004760-01	6.46078740-02	1.11418390-02	1.95640630-03	3.67223830-04	7.21748490-05	1.32151065-05	2.24485430-06
KAPPA(P)	3.92548470+04	2.34747330+04	7.38688850+03	1.67758230+03	3.29865480+02	6.44317780+01	1.13859718+01	2.05867230+00
KAPPA(R)	1.08147139+04	4.85446860+03	1.52531600+03	3.31105790+02	5.26564890+01	7.73424590+00	1.33924242+00	4.37855380-01
DENSITY	3.45314600-07	4.48900350-06	5.28118050-09	5.61123540-10	5.28116150-11			
KAPPA(P)	4.65224410-01	2.12032550-01	1.84033220-01	1.82743820-01	1.82645890-01			
KAPPA(R)	2.63575610-01	2.00632580-01	1.82391090-01	1.81497390-01	1.81448940-01			

THETA = 50.00000 13 DENSITIES

DENSITY	5.45230950-01	9.66093280-02	1.71916920-02	3.26079910-03	6.42943970-04	1.28190770-04	2.35489360-05	4.88282590-06
KAPPA(P)	2.80212420+04	1.16642738+04	3.09372140+03	6.09151490+02	1.13443617+02	2.15738518+01	4.81902770+00	8.02616220-01
KAPPA(R)	9.04110700+03	4.40216570+03	1.24371470+03	2.14043220+02	3.24034200+01	5.48583310+00	1.18736514+00	4.11977390-01
DENSITY	6.15808410-07	6.00543580-08	9.41812390-09	1.00067608-09	9.41812550-11			
KAPPA(P)	2.59566650-01	1.92991910-01	1.88465740-01	1.67759780-01	1.87719200-01			
KAPPA(R)	2.25496570-01	1.91088420-01	1.88489120-01	1.67946860-01	1.87927510-01			

THETA = 69.99996 13 DENSITIES

DENSITY	8.02348920-01	1.45313470-01	2.74452540-02	5.34674680-03	1.06265693-03	2.12249320-04	3.90854280-05	6.63856920-06
KAPPA(P)	1.36730630+04	4.82976390+03	1.00886373+03	1.93254110+02	3.85675390+01	7.43395460+00	1.46170908+00	3.65204790-01
KAPPA(R)	2.47881460+03	1.15784640+03	3.11356010+02	6.55501800+01	1.25957563+01	2.47065470+00	5.88708590-01	2.55217280-01
DENSITY	1.02007950-06	1.32610460-07	1.56011690-08	1.65762531-09	1.56011720-10			
KAPPA(P)	2.06364570-01	1.93779760-01	1.92449790-01	1.92316660-01	1.92303200-01			
KAPPA(R)	1.99604570-01	1.93140370-01	1.92570680-01	1.92521010-01	1.92516390-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.29680751+00	2.38987020-01	4.63091830-02	9.19273860-03	1.81332163-03	3.62362300-04	6.65991380-05	1.13214665-05
KAPPA(P)	5.36213470+03	1.73131400+03	3.62088980+02	7.19491010+01	1.45608581+01	3.00707540+00	6.15493360-01	2.44225570-01
KAPPA(R)	5.45480450+02	2.15595260+02	5.42084600+01	1.19840306+01	2.53029930+00	8.48353440-01	2.83479620-01	2.09338650-01
DENSITY	1.74175634-06	2.26427750-07	2.66367250-08	2.83036570-09	2.66384620-10			
KAPPA(P)	1.99529130-01	1.94648290-01	1.94072200-01	1.94122670-01	1.94115270-01			
KAPPA(R)	1.95904640-01	1.94143440-01	1.93930770-01	1.93985080-01	1.93982370-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.21008700+00	4.31683670-01	8.46507780-02	1.67035000-02	3.33048290-03	6.05467890-04	1.22349230-04	2.07909100-05
KAPPA(P)	2.30182360+03	5.86686120+02	1.20729917+02	2.52291220+01	5.10877878+00	1.09564463+00	3.25777380-01	2.10535070-01
KAPPA(R)	1.45584680+02	3.98676400+01	9.18031000+00	2.07507160+00	5.74956600-01	2.83363420-01	2.14735490-01	1.97781100-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	3.19980740-06	4.15975300-07	4.89360900-08	5.19967430-09	4.89380990-10
KAPPA(P)	1.95869430-01	1.93870660-01	1.93623630-01	1.93378470-01	1.93375190-01
KAPPA(R)	1.94191400-01	1.93582790-01	1.93508270-01	1.93435330-01	1.93434170-01

THETA = 224.99990 13 DENSITIES

DENSITY	3.98863070+00	7.87060850-01	1.55211740-01	3.06712050-02	6.11780460-03	1.22288312-03	2.24768860-04	3.82097870-05
KAPPA(P)	2.86243600+02	6.94267320+01	2.27787700+01	4.90883660+00	1.08919459+00	2.76458100-01	1.98196170-01	1.88779058-01
KAPPA(R)	1.42557678+01	3.44948520+00	8.82561500-01	3.51691110-01	2.32752870-01	2.02006180-01	1.93460160-01	1.91321500-01
DENSITY	5.87943600-06	7.64197170-07	8.99052080-08	9.55243470-09	8.99052230-10			
KAPPA(P)	1.87717330-01	1.87584660-01	1.87567220-01	1.87564960-01	1.87564780-01			
KAPPA(R)	1.90393420-01	1.90834450-01	1.90825860-01	1.90824900-01	1.90824710-01			

THETA = 340.00012 13 DENSITIES

DENSITY	7.34373680+00	1.45713837+00	2.88041990-01	5.69590320-02	1.13636116-02	2.27156100-03	4.17522560-04	7.09774020-05
KAPPA(P)	2.30032740+02	3.18701230+01	6.99424730+00	1.52589556+00	4.12771340-01	2.19518450-01	1.91319010-01	1.88026008-01
KAPPA(R)	6.82891620+00	1.63389901+00	5.06946500-01	2.69813850-01	2.11909700-01	1.96452220-01	1.92052790-01	1.91023850-01
DENSITY	1.09196.40-05	1.41953681-06	1.67005350-07	1.77443270-08	1.67005398-09			
KAPPA(P)	1.87631560-01	1.87573400-01	1.87565710-01	1.87564960-01	1.87564780-01			
KAPPA(R)	1.90856230-01	1.90828910-01	1.90825280-01	1.90824710-01	1.90824710-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.30388638+01	2.54893030+00	5.09166910-01	1.01564623-01	2.02646960-02	4.05096570-03	7.44587640-04	1.20877610-04
KAPPA(P)	6.80065450+01	1.57279434+01	3.35722920+00	7.66510100-01	2.77483450-01	1.99599700-01	1.89034070-01	1.87768390-01
KAPPA(R)	3.37994650+00	8.89084670-01	3.51249670-01	2.32460490-01	2.02090230-01	1.93722410-01	1.91390510-01	1.90012890-01
DENSITY	1.94734620-05	2.53154720-06	2.97827910-07	3.16442330-08	2.97820000-09			
KAPPA(P)	1.87595730-01	1.87568720-01	1.87565160-01	1.87564780-01	1.87564780-01			
KAPPA(R)	1.90839600-01	1.90826620-01	1.90824900-01	1.90824710-01	1.90824710-01			

THETA = 699.99976 13 DENSITIES

DENSITY	2.15500660+01	4.21952660+00	8.43236090-01	1.68230200-01	3.35679680-02	6.71041180-03	1.23341870-03	2.09676020-04
KAPPA(P)	3.62549450+01	6.21701480+00	1.76324400+00	4.57995560-01	2.26712410-01	1.92713820-01	1.88253090-01	1.87667030-01
KAPPA(R)	1.84185473+00	5.59447940-01	2.80756360-01	2.14840320-01	1.97247100-01	1.92402450-01	1.91120880-01	1.90072040-01
DENSITY	3.22578240-05	4.19352050-06	4.93353490-07	5.24188310-08	4.93353580-09			
KAPPA(P)	1.87580530-01	1.87566840-01	1.87564960-01	1.87564780-01	1.87564780-01			
KAPPA(R)	1.90838460-01	1.90825660-01	1.90824900-01	1.90824710-01	1.90824710-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 999,99967 13 DENSITIES

DENSITY	3.67420900+01	7.20154070+00	1.43956889+00	2.07234020-01	5.73156260-02	1.14577949-02	2.10681026-03	3.50015250-04
KAPPA(P)	1.84468190+01	4.12048550+00	9.20145120-01	3.04207200-01	2.03469940-01	1.89709180-01	1.87059670-01	1.87614870-01
KAPPA(R)	1.01150910+00	3.84103820-01	2.40418770-01	2.04222950-01	1.94320570-01	1.91626710-01	1.90948220-01	1.90840570-01
DENSITY	5.50791180-05	7.15029090-06	8.42383960-07	8.95033440-08	8.42384200-09			
KAPPA(P)	1.87572460-01	1.87565710-01	1.97564960-01	1.87564780-01	1.87564780-01			
KAPPA(R)	1.90828520-01	1.90825280-01	1.90824900-01	1.90824710-01	1.90824710-01			

THETA = 1499,99930 13 DENSITIES

DENSITY	6.74335690+01	1.32259920+01	2.64433600+00	5.27664080-01	1.05294722-01	2.10492780-02	3.86898930-03	6.57716229-04
KAPPA(P)	8.46721560+00	1.89481307+00	4.82966640-01	2.30819100-01	1.92262670-01	1.88402620-01	1.87695930-01	1.87587280-01
KAPPA(R)	5.71081670-01	2.86760180-01	2.16365110-01	1.97725210-01	1.92514840-01	1.91189910-01	1.90884830-01	1.90835780-01
DENSITY	1.01186623-04	1.31543244-05	1.54756169-06	1.64428520-07	1.54756200-08			
KAPPA(P)	1.87565548-01	1.87565340-01	1.87564960-01	1.87564960-81	1.87564960-01			
KAPPA(R)	1.90826610-01	1.90825280-01	1.90825090-01	1.90825090-01	1.90825090-01			

THETA = 2249,99670 13 DENSITIES

DENSITY	1.23816166+02	2.42931390+01	4.85753430+08	9.69357130-01	1.93437560-01	3.86699290-02	7.10778240-03	1.20830220-03
KAPPA(P)	3.88923700+00	9.04814710-01	3.01605920-01	2.03091430-01	1.89671620-01	1.87802038-01	1.87623070-01	1.87579470-01
KAPPA(R)	3.74161760-01	2.39662640-01	2.04030860-01	1.94256070-01	1.91614640-01	1.90956610-01	1.90853150-01	1.90830250-01
DENSITY	1.85892130-04	2.41658530-05	2.84305920-06	3.02075170-07	2.84305970-08			
KAPPA(P)	1.87567220-01	1.87565900-01	1.87565710-01	1.87565710-01	1.87565710-01			
KAPPA(R)	1.90826440-01	1.90825480-01	1.90825480-01	1.90825480-01	1.90825480-01			

1060000 C-4A.14 FREQ,TEMP(.12925-10),2-3-66 REMADE 3-28-67, 4 DENSITIES DELETED MATERL = 1006 NX = 786

GREY ABSORPTION COEFFICIENTS 21 TEMPERATURES

THETA = .12925 12 DENSITIES

DENSITY	2.63360690-01	8.77757520-02	2.63277960-02	8.77410940-03	2.63145070-03	8.76845290-04	2.62922030-04	8.75903290-05
KAPPA(P)	1.59516060+05	1.59547970+05	1.59563930+05	1.59579890+05	1.59595850+05	1.59595850+05	1.59611010+05	1.59611010+05
KAPPA(R)	5.22048230+02	5.22131750+02	5.22173520+02	5.22241410+02	5.22293630+02	5.22319760+02	5.22377200+02	5.22450340+02
DENSITY	2.62584230-05	8.74349990-06	2.61930910-06	8.71543590-07				
KAPPA(P)	1.59627770+05	1.59627770+05	1.59627770+05	1.59643720+05				
KAPPA(R)	5.22628000+02	5.22389400+02	5.23412540+02	5.24276900+02				

THETA = .17234 12 DENSITIES

DENSITY	1.96974260-01	6.55396490-02	1.96260010-02	6.52770430-03	1.95207969-03	6.48116580-04	1.93264680-04	6.39154100-05
KAPPA(P)	1.29340001+05	1.29430571+05	1.29534158+05	1.29598952+05	1.29663763+05	1.29702658+05	1.29715633+05	1.29650796+05
KAPPA(R)	1.27181460+03	1.27301060+03	1.27474310+03	1.27679710+03	1.28058200+03	1.28639620+03	1.29645640+03	1.30034720+03
DENSITY	1.89292920-05	6.19604160-06	1.79986318-06	5.71100860-07				
KAPPA(P)	1.29469412+05	1.29055766+05	1.28001843+05	1.25881960+05				
KAPPA(R)	1.32099420+03	1.32740330+03	1.32420820+03	1.30637310+03				

THETA = .21542 12 DENSITIES

DENSITY	1.55548140-01	5.15362420-02	1.53173369-02	5.04292020-03	1.48197445-03	4.79522380-04	1.36361660-04	4.10926570-05
KAPPA(P)	8.89028690+04	8.90897800+04	8.92324400+04	8.92681460+04	8.91343430+04	8.86720460+04	8.73431560+04	8.45670470+04
KAPPA(R)	2.27691920+03	2.28360350+03	2.30376480+03	2.33001490+03	2.36444820+03	2.38928620+03	2.38696900+03	2.33199620+03
DENSITY	1.08374617-05	2.94942600-06	6.89292650-07	1.95756300-07				
KAPPA(P)	7.76991780+04	6.47312880+04	4.19108470+04	2.23727720+04				
KAPPA(R)	2.15994920+03	1.81739590+03	1.20659780+03	6.78951670+02				

THETA = .25651 12 DENSITIES

DENSITY	1.25255450-01	4.08209440-02	1.17802608-02	3.70830660-03	1.00331072-03	2.07723680-04	6.85032080-05	1.84305670-05
KAPPA(P)	6.12243260+04	6.13469030+04	6.11631370+04	6.04093950+04	5.81976320+04	5.35461900+04	4.31785870+04	2.93830330+04
KAPPA(R)	3.70052470+03	3.75202120+03	3.81143090+03	3.84782050+03	3.76769950+03	3.51512360+03	2.88032950+03	2.08650500+03
DENSITY	4.76506200-06	1.48425149-06	4.23589930-07	1.33909720-07				
KAPPA(P)	1.67923700+04	1.08578105+04	8.36607380+03	8.06637850+03				
KAPPA(R)	1.19143040+03	7.93378160+02	6.19182440+02	5.97407810+02				

THETA = .30160 12 DENSITIES

DENSITY	9.89718530-02	3.07913950-02	8.17618180-03	2.29817490-03	5.42300660-04	1.48434020-04	3.89707208-05	1.20204643-05
KAPPA(P)	4.60704170+04	4.57204040+04	4.41787850+04	4.06396690+04	3.30739080+04	2.42434050+04	1.72792200+04	1.44085904+04
KAPPA(R)	5.76044470+03	5.82619760+03	5.75451470+03	5.37191580+03	4.39134080+03	3.18020160+03	2.19355750+03	1.77719220+03

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = .30160 CONTINUED

DENSITY	3.30458410-06	9.77468270-07	2.35960850-07	5.96960580-08
KAPPA(P)	1.36850363+04	1.41899602+04	1.47576956+04	1.29532238+04
KAPPA(R)	1.67998468+03	1.77495430+03	1.90038160+03	1.70516980+03

THETA = .34468 12 DENSITIES

DENSITY	7.37156010-02	2.10309520-02	5.00273770-03	1.34367081-03	3.40320240-04	1.01800045-04	2.69615190-05	7.63475300-06
KAPPA(P)	4.06392910+04	3.93794720+04	3.53965420+04	2.97385660+04	2.43093040+04	2.19111280+04	2.10429300+04	2.06450300+04
KAPPA(R)	8.35077710+03	8.18231150+03	7.33747400+03	5.93682590+03	4.53708440+03	3.89558810+03	3.75269660+03	3.83609300+03
DENSITY	1.76616516-06	4.58686020-07	1.17950597-07	3.74522160-08				
KAPPA(P)	1.83321490+04	1.23795349+04	5.26249200+03	1.93807390+03				
KAPPA(R)	3.62424040+03	2.56714570+03	1.11016060+03	4.02872430+02				

THETA = .38776 12 DENSITIES

DENSITY	5.10979560-02	1.35654389-02	3.23841920-03	9.25774760-04	2.39621490-04	6.74603890-05	1.57715950-05	4.14959450-06
KAPPA(P)	4.40949420+04	4.10686320+04	3.63700120+04	3.31235570+04	3.12195550+04	2.96139230+04	2.52050570+04	1.67932110+04
KAPPA(R)	1.06162370+04	9.92071150+03	8.42295780+03	7.31827500+03	6.83950040+03	6.72179150+03	6.08553480+03	4.25623350+03
DENSITY	1.00248505-06	3.34844400-07	9.84319950-08	3.26213170-08				
KAPPA(P)	7.32047430+03	2.75212860+03	8.61165520+02	2.90496040+02				
KAPPA(R)	1.80755940+03	7.03283410+02	2.17868130+02	7.33578800+01				

THETA = .43085 12 DENSITIES

DENSITY	3.47435960-02	9.31434130-03	2.31765360-03	6.54741540-04	1.57173540-04	4.14550870-05	1.01544353-05	3.00919530-06
KAPPA(P)	5.46442080+04	5.04733070+04	4.67794800+04	4.41655320+04	3.93047200+04	2.97177560+04	1.55154237+04	6.44003910+03
KAPPA(R)	1.14942438+04	1.08929376+04	1.01475733+04	9.76617280+03	9.03995890+03	7.07866000+03	3.76066000+03	1.56077840+03
DENSITY	8.92981470-07	2.94378360-07	8.79673600-08	2.92076510-08				
KAPPA(P)	2.10365150+03	7.19078090+02	2.17602490+02	7.27435300+01				
KAPPA(R)	5.11777490+02	1.78129350+02	5.59260320+01	1.93826820+01				

THETA = .47393 11 DENSITIES

DENSITY	2.47715370-02	1.66429452-03	4.47568930-04	1.05642479-04	3.01025700-05	8.32373120-06	2.69988880-06	8.01885558-07
KAPPA(P)	7.06857930+04	6.12427000+04	5.31673600+04	3.62393160+04	1.87704660+04	6.94133830+03	2.47590180+03	7.61107670+02
KAPPA(R)	1.07873556+04	1.04624705+04	9.33550330+03	6.47620510+03	3.38791500+03	1.28548320+03	4.86195090+02	1.66769060+02
DENSITY	2.66497750-07	7.98672620-08	2.66147600-08					
KAPPA(P)	2.55685960+02	7.69557010+01	2.57336620+01					
KAPPA(R)	6.23011530+01	2.01466890+01	7.68011390+00					

ONLY ABSORPTION COEFFICIENTS CONTINUED

THETA = .51702 12 DENSITIES

DENSITY	1.04588450-02	5.04105460-03	1.19662524-03	3.23177160-04	8.22662270-05	2.54055230-05	7.41201740-06	2.44613850-06
KAPPA(P)	9.05310150+04	8.39939370+04	7.11111860+04	4.98862150+04	2.43990610+04	9.90336560+03	3.21139240+03	1.09421220+03
KAPPA(R)	8.87407420+03	8.83105600+03	7.75916490+03	5.56120430+03	2.03398730+03	1.25986510+03	4.94610200+02	2.11325580+02
DENSITY	7.30307640-07	2.42588320-07	7.23898460-08	2.39355750-08				
KAPPA(P)	3.29367130+02	1.09815311+02	3.29064920+01	1.11066052+01				
KAPPA(R)	7.65604600+01	2.81199690+01	9.09722800+00	3.15037020+00				

THETA = .56010 10 DENSITIES

DENSITY	9.08977700-04	2.59119820-04	7.09851450-05	2.28079510-05	6.77277310-06	2.24478600-06	6.69050050-07	2.21775550-07
KAPPA(P)	6.80501490+04	3.72236620+04	1.44528946+04	5.25038900+03	1.62577510+03	5.45634850+02	1.64002220+02	5.53457570+01
KAPPA(R)	4.50030450+03	2.66093240+03	1.27566120+03	6.35092060+02	2.86692420+02	1.19952993+02	4.22422100+01	1.55415950+01
DENSITY	6.56912690-08	2.14659090-08						
KAPPA(P)	1.77514990+01	7.22220270+00						
KAPPA(R)	5.13751750+00	1.99845221+00						

THETA = .60319 11 DENSITIES

DENSITY	1.09952713-02	7.44453620-04	2.24310360-04	6.40901470-05	2.10039500-05	6.24760230-06	2.06950730-06	6.14903860-07
KAPPA(P)	1.26050317+05	5.50006330+04	2.48173890+04	8.50883190+03	2.95197570+03	8.97560960+02	3.02031090+02	9.42725410+01
KAPPA(R)	4.67437130+03	2.55838100+03	1.51319710+03	8.32597170+02	4.54732780+02	1.89697360+02	7.79626560+01	2.75581960+01
DENSITY	2.01979430-07	5.69368200-08	1.90208630-00					
KAPPA(P)	3.57146140+01	1.56363758+01	9.89966220+00					
KAPPA(R)	1.07251241+01	4.22306000+00	2.11567510+00					

THETA = .86600 12 DENSITIES

DENSITY	1.40017171+01	4.47985180+00	1.66719070+00	2.94890840-01	3.73411260-02	5.10676070-03	5.37436460-04	6.69516810-05
KAPPA(P)	6.63603520+03	6.59904350+03	6.50606380+03	6.02853900+03	5.70636740+03	5.22113430+03	3.52434520+03	2.25986400+03
KAPPA(R)	2.58330490+02	2.52370920+02	2.52307040+02	2.51947310+02	2.50137300+02	2.44160030+02	2.26166160+02	1.96436640+02
DENSITY	7.03579450-06	1.60993800-07	1.03725008-08	9.78891960-10				
KAPPA(P)	1.43306370+03	4.71297710+02	5.94318320+01	5.72418390+00				
KAPPA(R)	1.53377150+02	5.46006530+01	7.38240080+00	7.50606970-01				

THETA = 1.10000 12 DENSITIES

DENSITY	1.77573247+00	5.24595390-01	1.56655610-01	3.14473670-02	3.09691520-03	5.45422410-04	6.40059160-05	1.07425300-05
KAPPA(P)	3.05097000+04	3.00104200+04	2.97057490+04	2.76422280+04	2.58379570+04	2.20475690+04	1.45336209+04	7.47253730+03
KAPPA(R)	1.86270670+03	1.75869960+03	1.75441360+03	1.73555050+03	1.67058630+03	1.51339300+03	1.18015360+03	7.52017000+02

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1.10000 CONTINUED

DENSITY	1.97460650-05	1.46140120-07	1.40717034-08	1.39677496-09
KAPPA(P)	2.00050070+03	3.00900590+02	2.69987340+01	2.62140910+00
KAPPA(R)	3.33742570+02	3.75712810+01	3.50025930+00	3.98960440-01

THETA = 1.30000 12 DENSITIES

DENSITY	4.45014660-01	1.23946819-01	4.29662650-02	7.20391980-03	9.63931040-04	1.65296450-04	2.96989170-05	7.74703050-06
KAPPA(P)	7.67032960+04	7.36580200+04	7.25840140+04	6.67360040+04	5.62409250+04	4.03004060+04	1.77508720+04	6.15510420+03
KAPPA(R)	8.37335230+03	7.55450930+03	7.44263280+03	7.04927440+03	6.03849740+03	4.24119340+03	2.00206570+03	8.15653700+02

DENSITY	2.07967470-06	1.97367160-07	1.90347430-08	1.55482949-09
KAPPA(P)	1.71433400+03	1.50310020+02	1.53537537+01	2.83954040+00
KAPPA(R)	2.48879780+02	2.29307770+01	3.11964740+00	7.53097180-01

THETA = 1.50000 12 DENSITIES

DENSITY	3.00201910-01	6.23999860-02	2.94974690-02	4.07351420-03	7.01254260-04	1.36049750-04	2.04716990-05	8.16054170-06
KAPPA(P)	9.89925610+04	9.41175630+04	9.14639310+04	8.12036310+04	6.27679560+04	4.05463040+04	1.63795672+04	5.14201330+03
KAPPA(R)	1.36920408+04	1.20841501+04	1.17721277+04	1.07438625+04	8.36607380+03	5.13445970+03	2.12975810+03	7.69553090+02

DENSITY	2.29609680-06	2.20515040-07	1.97147260-08	1.34273002-09
KAPPA(P)	1.37913250+03	1.26775774+02	1.71731990+01	3.95760870+00
KAPPA(R)	2.25545660+02	2.44448600+01	4.73887600+00	1.17131492+00

THETA = 2.25000 12 DENSITIES

DENSITY	9.76039620-02	2.70743090-02	1.00996959-02	2.24206770-03	5.03322240-04	1.46224130-04	4.02621030-05	1.23210676-05
KAPPA(P)	1.67527610+05	1.42343710+05	1.24119404+05	8.64293460+04	4.73347500+04	2.21909440+04	8.29153160+03	3.47350650+03
KAPPA(R)	7.14247660+04	5.69369610+04	4.89446410+04	3.28026350+04	1.68532690+04	7.66730070+03	3.08362130+03	1.37621180+03

DENSITY	3.16201640-06	2.27367110-07	2.06572400-08	1.96671770-09
KAPPA(P)	1.45316610+03	2.21220500+02	2.22390550+01	2.47639520+00
KAPPA(R)	5.39764470+02	5.74267360+01	5.47531600+00	7.70732430-01

THETA = 3.40002 12 DENSITIES

DENSITY	8.23291540-02	2.45433050-02	1.01586472-02	2.66625610-03	6.49576490-04	1.79300040-04	4.47956290-05	1.34034299-05
KAPPA(P)	1.55920640+05	1.33572540+05	1.16378120+05	9.41175630+04	6.94170950+04	3.67575880+04	1.33337802+04	4.46663210+03
KAPPA(R)	1.17113636+05	9.52633020+04	7.70164230+04	4.72732500+04	2.14352030+04	8.43875300+03	2.77939890+03	1.04149240+03

DENSITY	3.72479040-06	3.06392160-07	2.60382340-08	2.39903350-09
KAPPA(P)	1.36025490+03	1.07395240+02	2.27340980+01	2.69202580+00
KAPPA(R)	3.85245470+02	6.05621390+01	6.92612160+00	8.95497370-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00001 12 DENSITIES

DENSITY	8.75303250-02	2.75404340-02	1.17104931-02	3.11430280-03	7.62719680-04	2.19857720-04	5.71392150-05	1.69270110-05
KAPPA(P)	1.47148650+05	1.31334130+05	1.20632001+05	1.60117518+05	6.67684250+04	3.51718010+04	1.28860415+04	4.56028260+03
KAPPA(R)	1.09309.34+05	9.40422970+04	7.76448080+04	4.60599910+04	2.49143670+04	1.30051399+04	4.74046220+03	1.65540330+03
DENSITY	4.62377690-06	3.95505970-07	3.49446690-08	3.40677430-09				
KAPPA(P)	1.34062440+03	1.45637400+02	1.67157260+01	1.75040815+00				
KAPPA(R)	4.60227200+02	5.42596020+01	5.20167130+00	6.01424060-01				

THETA = 7.00000 12 DENSITIES

DENSITY	9.93456600-02	3.25561170-02	1.41194786-02	3.83042310-03	9.47873080-04	2.74047260-04	7.27115770-05	2.19751140-05
KAPPA(P)	1.22051690+05	1.08423480+05	1.00669677+05	9.37231000+04	5.90889940+04	2.72579350+04	9.16016950+03	2.99032740+03
KAPPA(R)	7.63970910+04	7.13105750+04	6.57950520+04	5.21719310+04	2.89261100+04	1.25505515+04	4.09339490+03	1.43049100+03
DENSITY	6.05213230-06	5.66025250-07	5.63996460-08	5.62637880-09				
KAPPA(P)	6.32314260+02	7.77646830+01	6.62532870+00	7.27326350-01				
KAPPA(R)	3.88168670+02	2.47518430+01	2.00541090+00	3.33644240-01				

THETA = 10.00005 12 DENSITIES

DENSITY	1.21823742-01	4.09169850-02	1.80640780-02	5.03475730-03	1.27932043-03	3.77734110-04	1.03380175-04	3.29836030-05
KAPPA(P)	8.63271530+04	7.87946130+04	7.40429010+04	6.10287260+04	3.27284460+04	1.27474935+04	3.51456130+03	1.02473580+03
KAPPA(R)	3.61560640+04	3.54826790+04	3.37251790+04	2.71464070+04	1.63566520+04	7.42293570+03	2.10932610+03	5.65086640+02
DENSITY	9.70082210-06	9.61568560-07	9.60689360-06	9.60576960-09				
KAPPA(P)	2.71041710+02	2.35472720+01	2.30112000+00	3.42630200-01				
KAPPA(R)	1.30406450+02	9.37859510+00	9.98462670-01	2.56922710-01				

56 DIANE/SCAT C-1A TEMP(1-2250 EV) 11-7-67 SADY INPUT TAPES(1303,1159) MATERL = 3086 NK = 861

GREY ABSORPTION COEFFICIENTS 21 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	3.65519600+00	4.02441910-01	2.88954830-02	1.63568764-03	8.54247240-05	5.25080120-06	4.72240790-07	6.37657310-08
KAPPA(P)	1.84082610+04	1.79490760+04	1.59935197+04	1.45871160+04	8.97078040+03	3.72177460+03	1.05526160+03	1.93580020+02
KAPPA(R)	9.05953620+02	6.66710440+02	8.57943290+02	8.10982800+02	6.64497390+02	3.95256520+02	1.20711310+02	2.42400440+01
DENSITY	9.35341410-09	1.20675627-09	1.41370100-10	1.45867150-11	1.11852547-12			
KAPPA(P)	2.86292600+01	3.54025930+00	4.33707390-01	8.36249810-02	5.24529070-02			
KAPPA(R)	3.57504630+00	4.78921290-01	9.31138830-02	4.50417240-02	4.57837078-02			

THETA = 1.50000 13 DENSITIES

DENSITY	2.95550670-01	2.80683410-02	2.10740710-03	1.74926900-04	2.16832620-05	3.71062628-06	6.53966350-07	1.87704983-07
KAPPA(P)	1.00192620+05	9.23970130+04	7.41347730+04	4.46585020+04	1.31922386+04	2.30557178+03	3.84785068+02	6.49445593+01
KAPPA(R)	1.38030517+04	1.18622925+04	9.91993820+03	5.69786930+03	1.74843600+03	3.65798250+02	6.69123788+01	1.39693267+01
DENSITY	1.46241754-08	1.38230986-09	1.35189990-10	1.39012840-11	1.30215583-12			
KAPPA(P)	1.44958674+01	3.98309430+00	6.95726120-01	1.37039910-01	7.42705340-02			
KAPPA(R)	4.06449690+00	1.17124640+00	2.44832900-01	8.91683680-02	6.88532400-02			

THETA = 2.25000 13 DENSITIES

DENSITY	8.70665090-02	9.67161460-03	1.15602371-03	1.77193130-04	3.14972630-05	5.30496390-06	7.55519768-07	1.87570761-07
KAPPA(P)	1.80105630+05	1.20664037+05	6.90198850+04	2.58154240+04	6.91191480+03	2.02370640+03	5.73308500+02	1.12862356+02
KAPPA(R)	6.91338600+04	5.08001580+04	2.42974760+04	8.08283790+03	2.60278400+03	7.73198600+02	1.78871960+02	2.74381760+01
DENSITY	1.97044600-08	1.95194450-09	1.65570550-10	1.76294880-11	1.59310780-12			
KAPPA(P)	1.71604670+01	2.47478140+00	5.02415250-01	1.54774310-01	1.07779009-01			
KAPPA(R)	4.26367930+00	7.65780300-01	2.06391170-01	1.21310244-01	1.02991171-01			

THETA = 3.40000 13 DENSITIES

DENSITY	6.76349600-02	9.58474070-03	1.44972867-03	2.20337760-04	3.46327770-05	6.00368470-06	9.94734530-07	1.42202700-07
KAPPA(P)	1.85817440+05	1.23768720+05	6.58167920+04	4.21327210+04	1.08789056+04	2.16356140+03	4.61240660+02	1.02682013+02
KAPPA(R)	1.36423660+05	8.24427980+04	3.48681010+04	9.94436060+03	2.32114740+03	5.63233320+02	1.46109800+02	3.21318090+01
DENSITY	1.96960660-08	2.38094140-09	2.43140920-10	2.39376160-11	2.22630960-12			
KAPPA(P)	1.78816690+01	2.67597900+00	5.29181930-01	1.83252000-01	1.39765670-01			
KAPPA(R)	5.29790650+00	8.71808530-01	2.45091420-01	1.53197240-01	1.35315930-01			

THETA = 5.00000 13 DENSITIES

DENSITY	6.94545640-02	1.09485748-02	1.46020698-03	2.67790410-04	4.41666760-05	7.57854000-06	1.24873442-06	1.86663280-07
KAPPA(P)	1.94967640+05	1.39247750+05	9.53891320+04	4.07806750+04	1.06933248+04	2.19458000+03	3.99218948+02	7.75998050+01
KAPPA(R)	1.30773710+05	6.63644290+04	3.81755240+04	1.48450963+04	3.92136450+03	7.00294130+02	1.49499338+02	2.73998620+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	2.65159560-06	3.38115000-09	3.96680530-10	4.21334180-11	3.96533850-12
KAPPA(P)	1.30163534+01	1.76109151+00	3.20717690-01	1.54929210-01	1.37168660-01
KAPPA(R)	3.97261130+00	6.01428690-01	1.98381360-01	1.42524980-01	1.34674160-01

THETA = 7.00000 13 DENSITIES

DENSITY	7.86757070-02	1.27176056-02	2.03996220-03	3.31046070-04	5.63298530-05	9.07622800-06	1.68510958-06	2.80517420-07
KAPPA(P)	1.83160080+05	1.35004030+05	9.12903080+04	3.29188240+04	7.54527610+03	1.38496190+03	2.40186070+02	3.70378368+01
KAPPA(R)	9.15913580+04	7.93782690+04	4.65918050+04	1.49426074+04	3.38745740+03	6.66266660+02	9.03092580+01	1.11311221+01
DENSITY	4.29413560-08	5.58343600-09	6.56866770-10	6.97907250-11	6.56853720-12			
KAPPA(P)	5.10202740+00	7.33444750-01	2.03572100-01	1.42409720-01	1.35860990-01			
KAPPA(R)	1.55866545+00	3.33649920-01	1.67794880-01	1.40659100-01	1.33804030-01			

THETA = 10.00000 13 DENSITIES

DENSITY	9.72435140-02	1.60603780-02	2.69570370-03	4.40162440-04	8.03571130-05	1.54469350-05	2.81088840-06	4.76870950-07
KAPPA(P)	1.49790050+05	1.09211306+05	5.97843970+04	1.66950730+04	2.82655780+03	4.61909480+02	7.36723040+01	1.16772206+01
KAPPA(R)	4.18656050+04	3.87044540+04	2.55785630+04	9.43433450+03	1.74367980+03	2.32752570+02	3.09304450+01	4.51796640+00
DENSITY	7.33377750-08	9.53334790-09	1.12156607-09	1.19166450-10	1.12156620-11			
KAPPA(P)	1.81112681+00	3.46224460-01	1.59646220-01	1.37741710-01	1.35433980-01			
KAPPA(R)	8.10266550-01	2.56905240-01	1.56621840-01	1.35764290-01	1.33041780-01			

THETA = 15.00000 13 DENSITIES

DENSITY	1.35125630-01	2.34587430-02	4.05668160-03	7.39364910-04	1.41978490-04	2.01031180-05	5.15393580-06	8.75763330-07
KAPPA(P)	6.83542640+04	5.14054750+04	2.02836800+04	4.18274870+03	7.26835360+02	1.27949541+02	2.15160030+01	3.56223000+00
KAPPA(R)	1.19164446+04	6.52512430+03	4.42873330+03	1.44146610+03	3.20217350+02	6.09100960+01	1.05100399+01	1.82206612+00
DENSITY	1.34719640-07	1.75098910-08	2.05656250-09	2.15325580-10	1.85951580-11			
KAPPA(P)	6.42725660-01	2.01039070-01	1.43500750-01	1.38525480-01	1.50043650-01			
KAPPA(R)	4.25143640-01	1.82387260-01	1.39732830-01	1.35749230-01	1.47206340-01			

THETA = 22.49999 13 DENSITIES

DENSITY	2.11762170-01	3.78096090-02	6.98834200-03	1.32560680-03	2.59137950-04	5.15095210-05	9.42193610-06	1.56991367-06
KAPPA(P)	3.92226600+04	1.84134540+04	5.39630620+03	1.15914150+03	2.17771630+02	4.09785170+01	7.84475350+00	1.95468270+00
KAPPA(R)	3.65200490+03	1.82885420+03	6.12226290+02	1.70634520+02	3.99289240+01	8.82937270+00	2.03625280+00	6.63628090-01
DENSITY	2.24156630-07	2.64724900-08	2.96363320-09	2.88175940-10	2.55023670-11			
KAPPA(P)	7.45223480-01	3.03516890-01	1.96727840-01	1.93365710-01	2.01247050-01			
KAPPA(R)	3.16448270-01	1.95857090-01	1.75424420-01	1.86135940-01	1.97107500-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 33.99998 13 DENSITIES

DENSITY	3.57042310-01	6.57716750-02	1.24559110-02	2.41059180-03	4.55965240-04	8.36199860-05	1.41772784-05	2.23958510-06
KAPPA(P)	1.72278400+04	6.10654530+03	1.74105230+03	4.63839220+02	1.56897530+02	5.66018100+01	1.59852935+01	4.10127130+00
KAPPA(R)	1.72392160+03	6.32984500+02	1.96090230+02	5.25801660+01	1.69213970+01	5.96390010+00	1.86366400+00	6.97242040-01
DENSITY	3.16665020-07	4.00775310-08	4.69090660-09	4.98095180-10	4.68762490-11			
KAPPA(P)	1.07365425+00	3.31343730-01	2.18171460-01	2.04403560-01	2.02916850-01			
KAPPA(R)	3.16098630-01	2.19064520-01	2.01651360-01	1.99563850-01	1.99255970-01			

THETA = 50.00000 13 DENSITIES

DENSITY	5.99264440-01	1.10880638-01	2.02032060-02	3.60821890-03	6.57595880-04	1.21109679-04	2.12347840-05	3.56327680-06
KAPPA(P)	1.40462960+04	6.39145970+03	2.34700860+03	7.58893900+02	2.14843950+02	6.07209170+01	1.31576504+01	2.35903750+00
KAPPA(R)	1.82073940+03	6.61163370+02	2.32211810+02	7.33517210+01	2.05369140+01	5.55555310+00	1.36935976+00	4.40210660-01
DENSITY	5.46839600-07	7.13608050-08	8.35972800-09	8.88212590-10	8.35964580-11			
KAPPA(P)	5.30849540-01	2.45747160-01	2.07282430-01	2.03056700-01	2.02804460-01			
KAPPA(R)	2.49397070-01	2.11392220-01	2.03252550-01	1.99504000-01	1.99135060-01			

THETA = 69.99998 13 DENSITIES

DENSITY	9.15697790-01	1.59828640-01	2.93762150-02	5.12326170-03	9.65467630-04	1.09484050-04	3.46570200-05	5.08637660-06
KAPPA(P)	1.47031030+04	7.07436710+03	2.20362920+03	5.74795290+02	1.29204440+02	2.69753360+01	4.06941100+00	9.92409900-01
KAPPA(R)	2.87292420+03	1.17768620+03	3.75621480+02	8.72543080+01	1.68437720+01	3.07541240+00	7.00145580-01	3.31758160-01
DENSITY	9.05453440-07	1.17706698-07	1.38477925-08	1.47132892-09	1.38477940-10			
KAPPA(P)	3.19941420-01	2.14473730-01	2.03609770-01	2.02935110-01	2.02881340-01			
KAPPA(R)	2.45976010-01	2.09848800-01	1.99968580-01	1.99332890-01	1.99291040-01			

THETA = 99.99996 13 DENSITIES

DENSITY	1.36320633+00	2.40521930-01	4.30407480-02	8.18653170-03	1.61434336-03	3.21837780-04	5.91207880-05	1.00491757-05
KAPPA(P)	1.16254018+04	4.65241580+03	1.20624670+03	2.45749790+02	4.80244880+01	9.55704200+00	1.09341100+00	4.72331500-01
KAPPA(R)	3.64270170+03	1.51376310+03	4.08469160+02	7.16383770+01	1.10212251+01	2.08475280+00	6.47270290-01	3.24091500-01
DENSITY	1.54599952-06	2.00980100-07	2.36446280-08	2.51224280-09	2.36446320-10			
KAPPA(P)	2.33552590-01	2.05524300-01	2.03249290-01	2.03045130-01	2.03023610-01			
KAPPA(R)	2.19575900-01	2.01080690-01	1.99610760-01	1.99494820-01	1.99482450-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.20411370+00	4.00272030-01	7.57305230-02	1.48543578-02	2.95739060-03	5.90904000-04	1.00599798-04	1.84611070-05
KAPPA(P)	5.49543480+03	1.51911460+03	3.61312770+02	7.18036960+01	1.43434725+01	3.00666350+00	6.76000000-01	2.62011470-01
KAPPA(R)	1.18354790+03	4.48653980+02	1.26792891+02	2.53373850+01	4.78970240+00	1.06547993+00	3.60453250-01	2.24464210-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99935 CONTINUED

DENSITY	2.84016660-06	3.69221170-07	4.34360600-08	4.61529580-09	4.34380670-10
KAPPA(P)	2.08417500-01	2.02804930-01	2.02385090-01	2.02326000-01	2.02319730-01
KAPPA(R)	2.01716500-01	1.98986360-01	1.98776140-01	1.98752280-01	1.98749710-01

THETA = 224.99990 13 DENSITIES

DENSITY	3.72025420+00	7.03822280-01	1.37719670-01	2.72229480-02	5.43022360-03	1.08544094-03	1.99506450-04	3.39154400-05
KAPPA(P)	1.89172730+03	5.48122060+02	1.15629018+02	2.37078440+01	4.90743790+00	1.02397479+00	3.17504590-01	2.14416470-01
KAPPA(R)	1.95470730+02	7.50516820+01	1.84021950+01	4.03798570+00	9.43810310-01	3.53170260-01	2.27351960-01	2.01580790-01
DENSITY	5.21772690-06	6.78304240-07	7.98001860-08	8.47877530-09	7.98002000-10			
KAPPA(P)	2.01657410-01	1.99926190-01	1.99957180-01	1.99930590-01	1.99927790-01			
KAPPA(R)	1.97397430-01	1.96788050-01	1.96866190-01	1.96856740-01	1.96855760-01			

THETA = 340.00012 13 DENSITIES

DENSITY	6.50854260+00	1.29235132+00	2.54979280-01	5.05293470-02	1.00853341-02	2.01621150-03	3.70594540-04	6.29999940-05
KAPPA(P)	7.95907430+02	1.87547080+02	3.94975620+01	8.19512830+00	1.71355386+00	4.56636910-01	2.33932420-01	2.01916710-01
KAPPA(R)	5.02476730+01	1.33886185+01	3.11143170+00	7.88113860-01	3.29422220-01	2.20538410-01	2.02276040-01	1.95902800-01
DENSITY	9.69228410-06	1.25999860-06	1.48234560-07	1.57499290-08	1.48234590-09			
KAPPA(P)	1.97349300-01	1.96658810-01	1.96567770-01	1.96556960-01	1.96555790-01			
KAPPA(R)	1.94799290-01	1.94605470-01	1.94579200-01	1.94576080-01	1.94575700-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.15742658+01	2.29412970+00	4.54122950-01	9.00835250-02	1.79844650-02	3.59556190-03	6.60098040-04	1.12351076-04
KAPPA(P)	1.04099154+02	3.57590700+01	7.92521780+00	1.74347804+00	4.73173900-01	2.11783650-01	1.91016780-01	1.88494210-01
KAPPA(R)	5.15401490+00	1.28708077+00	4.40009390-01	2.54999420-01	2.08695080-01	1.95471630-01	1.91928760-01	1.91131420-01
DENSITY	1.72846610-05	2.24701040-06	2.64355770-07	2.80878160-08	2.64355850-09			
KAPPA(P)	1.88139600-01	1.88094270-01	1.88088250-01	1.88087490-01	1.88087490-01			
KAPPA(R)	1.90971510-01	1.90954510-01	1.90952230-01	1.90951850-01	1.90951850-01			

THETA = 699.99976 13 DENSITIES

DENSITY	1.90668640+01	3.79238840+00	7.51741390-01	1.49201730-01	2.97903430-02	5.95601310-03	1.09477762-03	1.86109760-04
KAPPA(P)	5.66027470+01	1.29192440+01	2.83699950+00	6.74994730-01	2.63204230-01	1.90267330-01	1.89409670-01	1.88269650-01
KAPPA(R)	2.82315490+00	7.64284630-01	3.26631900-01	2.27443820-01	2.00821460-01	1.93438620-01	1.91446090-01	1.91023270-01
DENSITY	2.86321610-05	3.72218400-06	4.37902330-07	4.65271430-08	4.37902410-09			
KAPPA(P)	1.88114620-01	1.88090880-01	1.88087870-01	1.88087490-01	1.88087490-01			
KAPPA(R)	1.90961960-01	1.90953180-01	1.90952030-01	1.90951850-01	1.90951850-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 999.99967 13 DENSITIES

DENSITY	3.24466750+01	6.46293780+00	1.27599240+00	2.54733590-01	5.08650620-02	1.01696656-02	1.86929859-03	3.17776610-04
KAPPA(P)	2.92914680+01	6.53625900+00	1.46201349+00	4.04399790-01	2.19275570-01	1.92335320-01	1.88709400-01	1.88172150-01
KAPPA(R)	1.51246094+00	4.67332130-01	2.66814930-01	2.11378270-01	1.96396240-01	1.92270896-01	1.91221080-01	1.90983160-01
DENSITY	4.88866490-05	6.35549990-06	7.47710520-07	7.94442860-00	7.47710740-09			
KAPPA(P)	1.88160430-01	1.88089190-01	1.88087690-01	1.88007490-01	1.88087490-01			
KAPPA(R)	1.90956610-01	1.90952410-01	1.90951850-01	1.90951850-01	1.90951050-01			

THETA = 1499.99930 13 DENSITIES

DENSITY	5.94780650+01	1.17249609+01	2.34363460+00	4.67945330-01	9.34437160-02	1.86820170-02	3.43411860-03	5.83793050-04
KAPPA(P)	1.36761647+01	3.06934130+00	7.17594950-01	2.70746310-01	1.99410250-01	1.89705390-01	1.88335190-01	1.88125120-01
KAPPA(R)	7.97725590-01	3.38708980-01	2.29802970-01	2.01406290-01	1.93656560-01	1.91550460-01	1.91054510-01	1.90966170-01
DENSITY	8.96140660-05	1.16758270-05	1.37362132-06	1.45947340-07	1.37362156-08			
KAPPA(P)	1.86093140-01	1.88088250-01	1.88087490-01	1.88007490-01	1.88087490-01			
KAPPA(R)	1.90954130-01	1.90952030-01	1.90951050-01	1.90951050-01	1.90951050-01			

THETA = 2249.99870 13 DENSITIES

DENSITY	1.09132461+02	2.15324900+01	4.30497780+00	8.59637320-01	1.71665580-01	3.43224710-02	6.30887440-03	1.07249563-03
KAPPA(P)	6.32650410+00	1.43120963+00	3.99303220-01	2.18568680-01	1.92259550-01	1.88750660-01	1.88105090-01	1.88109230-01
KAPPA(R)	4.76386520-01	2.65345110-01	2.11050670-01	1.96305140-01	1.92252050-01	1.91240010-01	1.90980120-01	1.90958340-01
DENSITY	1.64999640-04	2.14499130-05	2.52350960-06	2.68123000-07	2.52351000-08			
KAPPA(P)	1.88009540-01	1.88007690-01	1.88087490-01	1.88087490-01	1.88087490-01			
KAPPA(R)	1.90952600-01	1.90952030-01	1.90951050-01	1.90951050-01	1.90951050-01			

10 DIANE/SCAT CF2-10A C1/JT, REDO OF RUN 1-6-67, TEMP(1-2250), TAPE 1432 MATERL = 1103 NX = 855

GREY ABSORPTION COEFFICIENTS 21 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	1.50448936+01	1.65645286+00	1.18931093-01	6.73166340-03	3.51395220-04	2.15391160-05	1.90175153-06	2.31765440-07
KAPPA(P)	1.15498476+05	9.59718290+04	8.42943390+04	4.08901530+04	1.06987157+04	2.52259880+03	5.15940260+02	9.22286610+01
KAPPA(R)	1.89542220+03	1.81688170+03	1.52447740+03	1.00419746+03	5.37082620+02	2.32125450+02	6.20957750+01	1.12740203+01
DENSITY	2.35865530-08	1.95465950-09	2.01011320-10	2.07550830-11	1.80890430-12			
KAPPA(P)	1.74234220+01	3.33345730+00	4.56761270-01	7.27607240-02	3.24682043-02			
KAPPA(R)	2.13248910+00	4.01599320-01	7.43899070-02	3.13399380-02	2.76817750-02			

THETA = 1.50000 13 DENSITIES

DENSITY	1.12861643+00	1.06821185-01	7.91111160-03	6.23696300-04	6.47193090-05	7.76495500-06	1.02585931-06	1.56056150-07
KAPPA(P)	3.06480650+05	2.50276070+05	1.99029810+05	6.47714340+04	1.44453795+04	2.96958330+03	5.77438510+02	9.73975410+01
KAPPA(R)	3.63951200+04	3.27035840+04	2.13000770+04	8.41605930+03	1.97822240+03	3.96921660+02	6.96996280+01	1.14822341+01
DENSITY	2.25078930-08	2.55797480-09	2.72163030-10	2.54694080-11	1.96362290-12			
KAPPA(P)	1.53250262+01	2.44131210+00	3.56990900-01	7.66758870-02	5.01732130-02			
KAPPA(R)	2.20956100+00	4.62496440-01	9.56302580-02	4.46515170-02	4.54529750-02			

THETA = 2.25000 13 DENSITIES

DENSITY	2.45000100-01	2.45959130-02	2.42440300-03	2.96516410-04	4.76055640-05	8.53239950-06	1.36791902-06	2.00061710-07
KAPPA(P)	5.26897480+05	3.42329820+05	2.95434450+05	8.45636600+04	1.54708500+04	2.78560390+03	4.63469000+02	7.37935220+01
KAPPA(R)	2.24612050+05	1.57782050+05	6.75470690+04	1.52088524+04	2.47553280+03	4.39504070+02	8.44697910+01	1.42209893+01
DENSITY	2.53593690-08	2.87026930-09	3.10463610-10	3.07079410-11	2.76760170-12			
KAPPA(P)	1.32573548+01	2.07944360+00	3.29678260-01	8.99711710-02	6.20525910-02			
KAPPA(R)	2.76344200+00	4.74012350-01	1.16554185-01	6.56214990-02	5.87834460-02			

THETA = 3.40000 13 DENSITIES

DENSITY	1.17157746-01	1.54203845-02	2.24940400-03	3.65701560-04	5.93507440-05	9.65475570-06	1.53642849-06	2.36159120-07
KAPPA(P)	6.32616630+05	4.64622260+05	2.49389190+05	6.12090240+04	1.24104107+04	2.34641050+03	4.08306020+02	6.77213168+01
KAPPA(R)	4.07134920+05	2.23154570+05	6.98901410+04	1.31428468+04	2.06438150+03	4.14724710+02	8.60994460+01	1.61396660+01
DENSITY	3.34026730-08	3.77672010-09	3.89767810-10	3.94091490-11	3.52419220-12			
KAPPA(P)	1.05934630+01	1.75794339+00	3.25512640-01	1.09892243-01	8.81287030-02			
KAPPA(R)	2.81591710+00	5.48354660-01	1.58385870-01	9.22753710-02	8.54312780-02			

THETA = 5.00000 13 DENSITIES

DENSITY	1.11560413-01	1.74922040-02	2.64711750-03	4.17228730-04	7.06065240-05	1.23768842-05	1.96037950-06	2.96689930-07
KAPPA(P)	5.77278180+05	4.27034460+05	2.16971200+05	5.70520910+04	1.12780657+04	2.09979700+03	3.48851370+02	5.51209060+01
KAPPA(R)	4.00568430+05	2.10424020+05	6.20297870+04	1.23245806+04	2.65456210+03	5.31411640+02	1.07706715+02	1.80557020+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	4.23321160-08	5.01847440-09	5.55390370-10	5.68343660-11	4.92473890-12
KAPPA(P)	8.62056010+00	1.37146086+00	2.63587210-01	1.19673031-01	1.10989019-01
KAPPA(R)	2.74256030+00	4.73108600-01	1.54420630-01	1.07786379-01	1.08618776-01

THETA = 7.00000 13 DENSITIES

DENSITY	1.21094749-01	1.97640430-02	3.16674520-03	5.20935160-04	8.72906690-05	1.53605200-05	2.53874680-06	3.96080690-07
KAPPA(P)	4.93797090+05	4.68017040+05	2.19269910+05	4.95288140+04	9.36791400+03	1.31724530+03	2.22638100+02	3.82230978+01
KAPPA(R)	3.21955910+05	2.03848010+05	6.74680820+04	1.46636494+04	2.74538600+03	4.60857890+02	7.29933210+01	1.20489507+01
DENSITY	5.75534930-08	6.91439760-09	7.71341510-10	7.64067720-11	6.81612640-12			
KAPPA(P)	6.16958.40+00	1.02454359+00	2.38068220-01	1.39192690-01	1.31563980-01			
KAPPA(R)	2.21082110+00	4.28407340-01	1.65536260-01	1.30208660-01	1.29231740-01			

THETA = 10.00000 13 DENSITIES

DENSITY	1.44804750-01	2.40732740-02	4.02920180-03	6.71746200-04	1.15750110-04	2.09689030-05	3.53976610-06	5.60055540-07
KAPPA(P)	4.06870400+05	3.47444390+05	1.19434086+05	2.24202530+04	3.94749680+03	7.14993140+02	1.34913240+02	2.49958790+01
KAPPA(R)	1.74786400+05	1.26341013+05	5.16543640+04	1.04055529+04	1.61376290+03	2.89037000+02	5.68518610+01	9.00892780+00
DENSITY	8.00879950-08	9.76979870-09	1.07652243-09	1.10926875-10	1.03920507-11			
KAPPA(P)	4.39101750+00	7.40670810-01	2.25017070-01	1.53543550-01	1.46129650-01			
KAPPA(R)	1.56041.40+00	3.47057780-01	1.77965070-01	1.48531680-01	1.43899370-01			

THETA = 15.00000 13 DENSITIES

DENSITY	1.91084410-01	3.26839680-02	5.51972100-03	9.59340050-04	1.70243470-04	3.10503650-05	5.28853150-06	8.43429100-07
KAPPA(P)	2.41469650+05	1.40262360+05	4.47148040+04	9.70483960+03	2.13598670+03	4.44595090+02	8.25357650+01	1.47129780+01
KAPPA(R)	7.31911640+04	5.95070450+04	2.67609730+04	5.65045273+03	1.03697580+03	1.98599840+02	3.46075880+01	5.60164600+00
DENSITY	1.25772650-07	1.62368920-06	1.90763800-09	2.01998690-10	1.86344360-11			
KAPPA(P)	2.39328130+00	4.26526450-01	1.76770320-01	1.49227390-01	1.49190240-01			
KAPPA(R)	9.46314060-01	2.52332660-01	1.58146100-01	1.46509350-01	1.47333290-01			

THETA = 22.49999 13 DENSITIES

DENSITY	2.76282520-01	4.68799590-02	8.15712910-03	1.43858259-03	2.60925930-04	4.90935460-05	8.81223050-06	1.48343934-06
KAPPA(P)	1.00533671+05	5.09128120+04	1.94049970+04	4.71169440+03	9.89120280+02	1.78423510+02	2.92018530+01	4.87464350+00
KAPPA(R)	2.66091360+04	2.29324880+04	1.21749150+04	2.99804260+03	5.81202920+02	8.53468020+01	1.19183471+01	1.81830744+00
DENSITY	2.24064920-07	2.84369540-08	3.30215720-09	3.42369760-10	3.16501000-11			
KAPPA(P)	9.29795630-01	2.66449090-01	1.69452260-01	1.60019110-01	1.61247150-01			
KAPPA(R)	4.36013560-01	2.07009620-01	1.64322550-01	1.57611050-01	1.58928480-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 35.99990 11 DENSITIES

DENSITY	4.06097940-01	7.26023900-02	1.27772890-02	2.39009830-03	4.46026580-04	8.61671180-05	1.84618750-05	2.57644508-06
KAPPA(P)	4.07654680+04	2.18104160+04	7.64996170+03	1.62888970+03	3.01271880+02	6.07682210+01	1.21001395+01	2.40039490+00
KAPPA(R)	1.13276[illegible]+04	[illegible]+03	4.17563190+03	1.12797180+03	1.85477180+02	2.95598120+01	5.26749850+00	1.11031200+00
DENSITY	[illegible]-07	4.99027360-08	5.86132710-09					
KAPPA(P)	[illegible]-01	2.14739980-01	1.87931880-01					
KAPPA(R)	[illegible]-01	1.88135840-01	1.83102680-01					

THETA = 50.00000 13 DENSITIES

DENSITY	6.29613710-01	1.14197371-01	2.07007700-02	3.88471770-03	7.46690350-04	1.45037110-04	2.62524820-05	4.43692060-06
KAPPA(P)	1.92874090+04	9.71990270+03	2.95332220+03	6.49115920+02	1.34920260+02	2.99981570+01	5.74122710+00	1.10753820+00
KAPPA(R)	6.67961020+03	3.91655580+03	1.47816680+03	3.45609650+02	6.46382240+01	1.25913111+01	2.30259070+00	5.20222750-01
DENSITY	6.75353210-07	8.44412340-08	9.50070340-09	9.64906570-10	8.76876600-11			
KAPPA(P)	3.24665230-01	2.00709330-01	1.83131640-01	1.86828350-01	1.92626340-01			
KAPPA(R)	2.32497220-01	1.82987580-01	1.78549390-01	1.83799270-01	1.89909990-01			

THETA = 69.99998 13 DENSITIES

DENSITY	9.30696660-01	1.72916230-01	3.22218340-02	6.12534620-03	1.18926838-03	2.32922230-04	4.13400040-05	6.71539140-06
KAPPA(P)	1.09720553+04	4.67505830+03	1.33567080+03	2.93909800+02	6.42900540+01	1.51798665+01	4.25108820+00	1.25519995+00
KAPPA(R)	5.81656550-07	7.74941550-04	7.03837130+02	1.41676310+02	2.56571670+01	4.87576480+00	1.26028105+00	4.45366650-01
DENSITY	9.87499590-07	1.23090210-07	1.44468428-08	1.53315223-09	1.44277890-10			
KAPPA(P)	4.33567040-01	2.35297400-01	1.99073730-01	1.94490300-01	1.93994980-01			
KAPPA(R)	2.46694030-01	2.01089540-01	1.92401870-01	1.91302370-01	1.91153980-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.48742285+00	2.76359980-01	5.22525800-02	9.89448260-03	1.87725796-03	3.57227770-04	6.30070470-05	1.05203410-05
KAPPA(P)	7.06500000+03	2.50144030+03	6.64209070+02	1.85178640+02	5.55115980+01	1.61917030+01	3.95570860+00	8.97308900-01
KAPPA(R)	3.35895750+03	1.40526330+03	3.59455350+02	7.49384370+01	1.66408080+01	4.20042610+00	1.05686168+00	3.57619750-01
DENSITY	1.61199179-06	2.09416660-07	2.46349420-08	2.61743810-09	2.46347000-10			
KAPPA(P)	3.04161030-01	2.08062030-01	1.95367879-01	1.93991870-01	1.93915070-01			
KAPPA(R)	2.20426490-01	1.97060790-01	1.92844320-01	1.91336420-01	1.91224910-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.53746430+00	4.69619250-01	8.70237700-02	1.62935500-02	3.13319200-03	6.18082280-04	1.13233904-04	1.92369060-05
KAPPA(P)	4.84076950+03	1.82645260+03	5.47506300+02	1.43742990+02	3.47562000+01	7.29826030+00	1.50213470+00	4.14052310-01
KAPPA(R)	2.36503240+03	8.70269500+02	2.29514670+02	4.81741690+01	8.81545090+00	1.76560619+00	4.90128158-01	2.69121060-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	2.95917500-06	3.84685410-07	4.52569360-08	4.80855140-09	4.52569430-10			
KAPPA(P)	2.24669690-01	1.97080110-01	1.94906170-01	1.94746610-01	1.94732780-01			
KAPPA(R)	2.11670320-01	1.94660550-01	1.92447670-01	1.92314740-01	1.92306080-01			

THETA = 224.99990 13 DENSITIES

DENSITY	4.26502900+00	7.65087810-01	1.47652750-01	2.86441800-02	5.67040910-03	1.13143111-03	2.07879718-04	3.53362930-05
KAPPA(P)	3.06334670+03	1.11626540+03	2.72546690+02	5.51336340+01	1.14749452+01	2.36110650+00	5.76921770-01	2.47601410-01
KAPPA(R)	1.23651830+03	5.52110910+02	1.38006920+02	2.34468030+01	2.07450800+00	9.83059060-01	3.80910820-01	2.27240300-01
DENSITY	5.43625660-06	7.06706780-07	8.31425000-08	8.83389440-09	8.31425150-10			
KAPPA(P)	2.01780450-01	1.97391740-01	1.96931960-01	1.96884890-01	1.96879980-01			
KAPPA(R)	1.97915120-01	1.95046950-01	1.94779910-01	1.94757130-01	1.94754590-01			

THETA = 340.00612 13 DENSITIES

DENSITY	7.31996100+00	1.38316312+00	2.67903080-01	5.23659930-02	1.05173608-02	2.10104380-03	3.86127470-04	6.56386410-05
KAPPA(P)	1.42123130+03	3.86672450+02	6.29935579+01	1.63369420+01	3.43840590+00	8.11074630-01	2.85246980-01	2.09306620-01
KAPPA(R)	3.06731350+02	1.15795993+02	2.96905250+01	6.10269810+00	1.30882827+00	4.07478870-01	2.32250670-01	2.01370110-01
DENSITY	1.00961129-05	1.31275850-06	1.54443110-07	1.64095920-08	1.54443144-09			
KAPPA(P)	2.00323640-01	1.99081900-01	1.98939410-01	1.98922490-01	1.98920760-01			
KAPPA(R)	1.97275300-01	1.96695780-01	1.96636390-01	1.96629310-01	1.96628520-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.25440566+01	2.41878900+00	4.75077560-01	9.41567820-02	1.87506470-02	3.74666940-03	6.88592460-04	1.17056486-04
KAPPA(P)	5.17238970+02	1.18204590+02	2.69047800+01	5.63962170+00	1.22648626+00	3.67597010-01	2.21038410-01	2.02076490-01
KAPPA(R)	5.76409490+01	1.60103750+01	4.12589920+00	1.02941253+00	3.74182990-01	2.35129460-01	2.02714030-01	1.96926240-01
DENSITY	1.80086160-05	2.34112200-06	2.75425140-07	2.92639340-08	2.75425190-09			
KAPPA(P)	1.99192610-01	1.98984760-01	1.98924480-01	1.98917320-01	1.98916520-01			
KAPPA(R)	1.96004130-01	1.96004630-01	1.95964040-01	1.95981700-01	1.95981300-01			

THETA = 699.99976 13 DENSITIES

DENSITY	2.02700410+01	3.94953150+00	7.62308820-01	1.55904130-01	3.10574670-02	6.20623430-03	1.14065001-03	1.93904070-04
KAPPA(P)	2.07348690+02	5.62120410+01	1.26252305+01	2.50457930+00	6.16095190-01	2.61878920-01	2.06788030-01	1.98227680-01
KAPPA(R)	1.32613658+01	4.36046210+00	1.08840636+00	3.91017760-01	2.44380440-01	2.07094300-01	1.97124650-01	1.94933050-01
DENSITY	2.98313740-05	3.87804290-06	4.56243120-07	4.84758640-08	4.56243310-09			
KAPPA(P)	1.96915420-01	1.96712500-01	1.96685950-01	1.96682800-01	1.96682410-01			
KAPPA(R)	1.94578610-01	1.94522190-01	1.94514800-01	1.94513630-01	1.94513030-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 999.99967 13 DENSITIES

DENSITY	3.38435440+01	6.72335300+00	1.33279107+00	2.65141800-01	5.30268450-02	1.05968342-02	1.94762229-03	3.31085150-04
KAPPA(P)	9.92580410+01	2.30714280+01	4.86302650+00	1.06477850+00	3.41737970-01	2.17961460-01	1.97845270-01	1.94527458-01
KAPPA(R)	4.74396360+00	1.27997979+00	4.41314460-01	2.54773330-01	2.09422610-01	1.97137070-01	1.93799530-01	1.93053100-01
DENSITY	5.09359420-05	6.62168990-06	7.79019390-07	8.27708460-08	7.79019520-09			
KAPPA(P)	1.95986050-01	1.94557410-01	1.94545340-01	1.94543990-01	1.94543790-01			
KAPPA(R)	1.92927080-01	1.93209720-01	1.93206830-01	1.93206440-01	1.93206440-01			

THETA = 1499.99930 13 DENSITIES

DENSITY	6.16884410+01	1.22944256+01	2.44730390+00	4.87856970-01	9.74132540-02	1.94674780-02	3.57800480-03	6.08242450-04
KAPPA(P)	1.77967030+01	3.99421070+00	9.21066520-01	3.09294920-01	2.06210660-01	1.90751450-01	1.88660900-01	1.88355330-01
KAPPA(R)	9.54179010-01	3.73177950-01	2.39081690-01	2.04131070-01	1.94486350-01	1.91707210-01	1.91042180-01	1.90930260-01
DENSITY	9.35752480-05	1.21647273-05	1.43115326-06	1.52060100-07	1.43115369-08			
KAPPA(P)	1.88306560-01	1.88298840-01	1.88297900-01	1.88297710-01	1.88297710-01			
KAPPA(R)	1.90913090-01	1.90910220-01	1.90909840-01	1.90909840-01	1.90909840-01			

THETA = 2249.99670 13 DENSITIES

DENSITY	1.13421457+02	2.25066460+01	4.49466420+00	8.96185190-01	1.78956050-01	3.57639100-02	6.57321000-03	1.11741197-03
KAPPA(P)	8.22313460+00	1.83986333+00	4.82568260-01	2.32518840-01	1.94263070-01	1.89117830-01	1.88312400-01	1.88193420-01
KAPPA(R)	5.51336490-01	2.82347130-01	2.15797250-01	1.97666700-01	1.92562790-01	1.91275400-01	1.90960820-01	1.90919080-01
DENSITY	1.71908710-04	2.23480840-05	2.62920250-06	2.79350120-07	2.62920290-08			
KAPPA(P)	1.88172720-01	1.88169330-01	1.88168960-01	1.88166960-01	1.88168960-01			
KAPPA(R)	1.90911570-01	1.90910030-01	1.90909840-01	1.90909840-01	1.90909840-01			

29 DIANE/SCAT CH2-16A TEMP(1.5-1.E4) 4-19-67 INPUT TAPES(1832,1980) MATERL = 1181 NK = 904

GREY ABSORPTION COEFFICIENTS 24 TEMPERATURES

THETA = 1.50000 13 DENSITIES

DENSITY	2.50607070-01	2.35845130-02	1.70459802-03	1.25594270-04	1.20383882-05	1.62817645-06	2.62818840-07	4.29139090-08
KAPPA(P)	4.22979090+05	3.23611810+05	2.77013060+05	1.51036560+05	3.88910700+04	7.21348190+03	1.13134560+03	1.70946520+02
KAPPA(R)	1.74067010+04	1.52707409+04	1.31185422+04	8.31179540+03	3.21305010+03	8.14242300+02	1.53948930+02	2.82040048+01
DENSITY	6.26644060-09	7.17491540-10	7.74135040-11	8.09293390-12	7.59876950-13			
KAPPA(P)	3.02541080+01	5.63618820+00	9.01893980-01	2.00678330-01	1.23963761-01			
KAPPA(R)	6.52307568+00	1.53657050+00	3.32352870-01	1.44029230-01	1.18748201-01			

THETA = 2.25000 13 DENSITIES

DENSITY	5.79339540-02	5.77843620-03	5.89922730-04	7.71702980-05	1.30555139-05	2.38815380-06	3.90268870-07	6.18214850-08
KAPPA(P)	7.84441770+05	5.28428760+05	3.16807610+05	8.30958430+04	1.52128526+04	3.19213710+03	7.23996180+02	1.32869700+02
KAPPA(R)	1.27363432+05	9.39670920+04	5.04914810+04	1.79258280+04	4.46251120+03	1.13179400+03	2.56560368+02	4.24478318+01
DENSITY	9.14635970-09	1.16234076-09	1.25579760-10	1.21483246-11	1.11682642-12			
KAPPA(P)	1.98686650+01	2.82820710+00	5.63322660-01	2.02819680-01	1.51045220-01			
KAPPA(R)	6.19079470+00	9.45562740-01	2.71248740-01	1.70272870-01	1.46204490-01			

THETA = 3.40000 13 DENSITIES

DENSITY	3.46769410-02	4.49439660-03	6.61266940-04	1.07970551-04	1.89615000-05	3.54344930-06	6.12761530-07	9.47172250-08
KAPPA(P)	6.02329480+05	3.06937640+05	1.44639260+05	5.16182190+04	1.16550974+04	2.20586270+03	4.58051200+02	9.81689018+01
KAPPA(R)	2.71028090+05	1.70430000+05	7.88024930+04	2.43812550+04	5.03963470+03	8.54567928+02	1.79735610+02	3.39322530+01
DENSITY	1.36995914-08	1.70430237-09	1.83394790-10	1.85363040-11	1.73089961-12			
KAPPA(P)	1.67524400+01	2.54093390+00	5.33811440-01	2.17356590-01	1.77944060-01			
KAPPA(R)	5.47728000+00	9.45102620-01	2.95361270-01	1.92407060-01	1.73128880-01			

THETA = 5.00000 13 DENSITIES

DENSITY	3.54160400-02	5.63044160-03	9.27662120-04	1.58512550-04	2.84165170-05	5.19699530-06	8.94125310-07	1.48171390-07
KAPPA(P)	3.54560250+05	1.87912170+05	9.70886690+04	3.84559970+04	9.85584500+03	2.01970750+03	3.66063910+02	7.82794150+01
KAPPA(R)	1.84012870+05	1.42784510+05	6.95884520+04	2.09522830+04	4.37925960+03	8.06729140+02	1.52327520+02	2.80837858+01
DENSITY	2.04688080-08	2.62703550-09	3.08490540-10	3.27699300-11	3.08413530-12			
KAPPA(P)	1.17523942+01	1.63420735+00	3.40882640-01	1.91040170-01	1.75603260-01			
KAPPA(R)	4.12772030+00	6.51654410-01	2.36293640-01	1.80596680-01	1.72653430-01			

THETA = 7.00000 13 DENSITIES

DENSITY	4.45676060-02	7.55845870-03	1.27119743-03	2.23717390-04	4.03883190-05	7.42491070-06	1.29946242-06	2.17832390-07
KAPPA(P)	2.40915130+05	1.42824230+05	8.41511560+04	2.99507600+04	6.77398540+03	1.24587020+03	2.15393368+02	3.32580210+01
KAPPA(R)	9.30246040+04	8.31606410+04	4.86151260+04	1.50850266+04	3.22525380+03	6.30293720+02	8.48786820+01	1.05215756+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA =	7.00000	CONTINUED						
DENSITY	3.34213650-08	4.34282830-09	5.10893580-10	5.42819220-11	5.10088550-12			
KAPPA(P)	4.64019770+00	7.13202340-01	2.35489010-01	1.80324000-01	1.74412860-01			
KAPPA(R)	1.52663771+00	3.69915860-01	2.06856080-01	1.78423560-01	1.71593150-01			
THETA =	10.00000		13 DENSITIES					
DENSITY	5.16114040-02	1.04430878-02	1.86944633-03	3.31865130-04	6.14842250-05	1.19667331-05	2.18452900-06	3.70849330-07
KAPPA(P)	1.55361500+05	1.03869435+05	5.38867530+04	1.49593521+04	2.55044460+03	[illegible].17476800+02	6.66483920+01	1.06205944+01
KAPPA(R)	3.79335010+04	3.45927680+04	2.31072100+04	0.52237180+03	1.57865570+03	2.11952660+02	2.08576200+01	4.25031000+00
DENSITY	3.76396100-09	7.41478400-09	6.72324210-10	9.26844870-11	0.72324360-12			
KAPPA(P)	1.69454419+00	3.65908120-01	1.95996200-01	1.76121000-01	1.74020710-01			
KAPPA(R)	6.26859070-01	2.95571940-01	1.93094030-01	1.73320270-01	1.70911220-01			
THETA =	15.00000		13 DENSITIES					
DENSITY	9.47068840-02	1.66646600-02	3.03019900-03	5.67351700-04	1.10046130-04	2.18410360-05	4.00003290-06	6.81130630-07
KAPPA(P)	6.10879090+04	4.66752100+04	1.80557750+04	3.72824900+03	6.49041680+02	1.14175869+02	1.92306620+01	3.227[illegible]+00
KAPPA(R)	1.04629631+04	7.44461240+03	3.86225690+03	1.25544570+03	2.79236470+02	5.32796250+01	9.20477500+00	1.60045063+00
DENSITY	1.04762411-07	1.36198102-08	1.60054774-09	1.64396470-10	1.49480020-11			
KAPPA(P)	6.26933070-01	2.32697490-01	1.91209580-01	1.75694150-01	1.86542160-01			
KAPPA(R)	4.40256920-01	2.15637100-01	1.76782340-01	1.73234870-01	1.83044310-01			
THETA =	22.49999		13 DENSITIES					
DENSITY	1.56057150-01	2.81217220-02	5.32956860-03	1.02530312-03	2.01274090-04	4.00624940-05	7.33913210-06	1.23097993-06
KAPPA(P)	3.82573300+04	1.69204450+04	4.89550580+03	1.05075600+03	1.96854320+02	3.69017660+01	7.00926730+00	1.70[illegible]205+00
KAPPA(R)	3.27074460+03	1.62141410+03	5.38648360+02	1.50606720+02	3.49361790+01	7.00524520+00	1.07970684+00	6.56591250-01
DENSITY	1.80007620-07	2.18824710-08	2.48403440-09	2.47527370-10	2.22555430-11			
KAPPA(P)	7.05407630-01	3.19449520-01	2.26876380-01	2.23680910-01	2.30433950-01			
KAPPA(R)	3.29921670-01	2.25919490-01	2.07473010-01	2.16431320-01	2.25030170-01			
THETA =	33.99998		13 DENSITIES					
DENSITY	2.71031360-01	4.99767690-02	9.52766070-03	1.87741580-03	3.60556030-04	6.70994290-05	1.17079030-05	1.90071602-06
KAPPA(P)	1.67930130+04	5.75029030+03	1.60383500+03	4.19662550+02	1.30858990+02	4.94285090+01	1.30446375+01	3.59057160+00
KAPPA(R)	1.61924440+03	5.78950590+02	1.75963040+02	4.66276150+01	1.40735424+01	5.26572580+00	1.70286470+00	6.7[illegible]0130-01
DENSITY	2.75708970-07	3.50167270-08	4.10341060-09	4.35825210-10	4.10167790-11			
KAPPA(P)	9.82470670-01	3.42423500-01	2.44980010-01	2.33140500-01	2.31861510-01			
KAPPA(R)	3.32549060-01	2.45257150-01	2.29017440-01	2.29000600-01	2.27690730-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 50.00000 13 DENSITIES

DENSITY	4.65282460-01	5.60461040-02	1.60616150-02	2.97523280-03	5.55347800-04	1.04515628-04	1.85461190-05	3.12223960-06
KAPPA(P)	1.29558522+04	5.70923860+03	2.06653170+03	6.57201700+02	1.86254670+02	5.25401670+01	1.13923260+01	2.08909780+00
KAPPA(R)	1.70740400+03	6.13449530+02	2.07833220+02	6.39047680+01	1.79105150+01	4.89861730+00	1.26772123+00	4.46682830-01
DENSITY	4.79449190-07	6.23096320-08	7.33029690-09	7.74836570-10	7.33022470-11			
KAPPA(P)	3.19129190-01	2.68061730-01	2.34969630-01	2.31308720-01	2.31030390-01			
KAPPA(R)	2.73778740-01	2.39215610-01	2.30996890-01	2.26809460-01	2.26296770-01			

THETA = 69.99998 13 DENSITIES

DENSITY	7.05973460-01	1.29604210-01	2.37663390-02	4.40167110-03	8.41816950-04	1.65865560-04	3.03820070-05	5.16131070-06
KAPPA(P)	1.31605438+04	6.25036970+03	1.40465260+03	5.00204470+02	1.11956229+02	2.33637330+01	4.25837230+00	9.11079590-01
KAPPA(R)	2.83382620+03	1.11046030+03	3.31299220+02	7.68239130+01	1.47719183+01	2.75922540+00	6.80042960-01	3.55985950-01
DENSITY	7.93954460-07	1.03212052-07	1.21425519-08	1.29014666-09	1.21425540-10			
KAPPA(P)	3.30305430-01	2.40050010-01	2.30359380-01	2.29566160-01	2.29491110-01			
KAPPA(R)	2.73233090-01	2.34279600-01	2.23951580-01	2.22976160-01	2.22786580-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.09394376+00	2.02355340-01	3.71392840-02	7.15369730-03	1.41494728-03	2.82180120-04	5.18398240-05	8.81170210-06
KAPPA(P)	1.04363998+04	4.06430450+03	1.05566480+03	2.13705930+02	4.23994330+01	8.32840000+00	1.60853603+00	4.58225570-01
KAPPA(R)	3.42539120+03	1.36067370+03	3.54279690+02	6.29909420+01	9.75122560+00	1.93209013+00	6.51963370-01	3.38981410-01
DENSITY	1.35502435-06	1.76231040-07	2.07329830-08	2.20288090-09	2.07329910-10			
KAPPA(P)	2.52700320-01	2.27591930-01	2.25125550-01	2.24882550-01	2.24856690-01			
KAPPA(R)	2.35325320-01	2.17447240-01	2.15631790-01	2.15460430-01	2.15441900-01			

THETA = 149.99995 13 DENSITIES

DENSITY	1.84499993+00	3.45724670-01	6.60630300-02	1.30199436-02	2.59390460-03	5.18167000-04	9.52278710-05	1.61880050-05
KAPPA(P)	4.97093370+03	1.34983150+03	3.16568600+02	6.27629510+01	1.25155672+01	2.65208170+00	6.26626250-01	2.70090790-01
KAPPA(R)	1.32795740+03	3.91751190+02	1.10647666+02	2.21906710+01	4.24487760+00	9.75810440-01	3.50908420-01	2.29956750-01
DENSITY	2.49044560-06	3.23757850-07	3.80890140-08	4.04695940-09	3.80890210-10			
KAPPA(P)	2.22613430-01	2.17092240-01	2.16470720-01	2.16399290-01	2.16391720-01			
KAPPA(R)	2.09508910-01	2.06944700-01	2.05550160-01	2.06515660-01	2.06511940-01			

THETA = 224.99990 13 DENSITIES

DENSITY	3.20305480+00	6.14646540-01	1.20438264-01	2.38751520-02	4.76340760-03	9.51854890-04	1.74942020-04	2.97390390-05
KAPPA(P)	1.76984470+03	4.84967540+02	1.01878806+02	2.08241000+01	4.31615950+00	9.23270450-01	3.11285130-01	2.21319710-01
KAPPA(R)	1.79240230+02	6.51423540+01	1.59313520+01	3.49597740+00	8.41206170-01	3.35014660-01	2.26175050-01	2.04194150-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 220.99950 CONTINUED

DENSITY	4.57524030-05	5.94776520-07	6.99741550-08	7.43475710-09	6.99741670-10
KAPPA(P)	2.09268120-01	2.07546970-01	2.07737300-01	2.07710710-01	2.07707790-01
KAPPA(R)	2.00504520-01	1.99940390-01	2.00102200-01	2.00093600-01	2.00092600-01

THETA = 340.00012 13 DENSITIES

DENSITY	5.70054040+00	1.12613970+00	2.23161430-01	4.43236000-02	8.84722920-03	1.76808896-03	3.24965020-04	5.52423900-05
KAPPA(P)	7.15049060+02	1.67027740+02	3.49790380+01	7.16009320+00	1.52620184+00	4.27785190-01	2.34177400-01	2.05495730-01
KAPPA(R)	4.43731240+01	1.17243745+01	2.72958520+00	7.11023140-01	3.13918460-01	2.25308210-01	2.02309620-01	1.96947310-01

DENSITY	5.49970500-06	1.10434907-06	1.29981990-07	1.39104560-08	1.29982031-09
KAPPA(P)	2.01227330-01	2.00553950-01	2.00465320-01	2.00454700-01	2.00453490-01
KAPPA(R)	1.95960530-01	1.95783660-01	1.95759770-01	1.95756840-01	1.95756640-01

THETA = 499.99993 13 DENSITIES

DENSITY	1.00749451+01	2.00134320+00	3.97577930-01	7.89626770-02	1.57712290-02	3.15309810-03	5.79524870-04	9.05165600-05
KAPPA(P)	9.59387470+01	3.33046820+01	7.25896810+00	1.60103599+00	4.47077280-01	2.10045520-01	1.91524000-01	1.89195190-01
KAPPA(R)	4.90201810+00	1.20958773+00	4.21456710-01	2.50323050-01	2.07514720-01	1.95182160-01	1.91985380-01	1.91290320-01

DENSITY	1.51563062-05	1.97030950-06	2.31802529-07	2.46290350-08	2.31802620-09
KAPPA(P)	1.88444940-01	1.88789430-01	1.88782070-01	1.88781310-01	1.88781120-01
KAPPA(R)	1.91147400-01	1.91121300-01	1.91117850-01	1.91117280-01	1.91117280-01

THETA = 6[illegible].99976 13 DENSITIES

DENSITY	1.60195710+01	3.31036930+00	6.58248670-01	1.30787160-01	2.61244400-02	5.22306980-03	9.59983960-04	1.63192040-04
KAPPA(P)	5.33499060+01	1.19776089+01	2.60538460+00	6.27024230-01	2.55922650-01	1.90050340-01	1.90059330-01	1.88992490-01
KAPPA(R)	2.66739060+00	7.22829280-01	3.19443840-01	2.24772390-01	2.00144830-01	1.93354690-01	1.91560660-01	1.91211140-01

DENSITY	2.51063450-05	3.26382759-06	3.83962090-07	4.07981190-08	3.83982200-09
KAPPA(P)	1.88813730-01	1.88785460-01	1.88781690-01	1.88781310-01	1.88781120-01
KAPPA(R)	1.91132570-01	1.91119380-01	1.91117470-01	1.91117280-01	1.91117280-01

THETA = 999.99967 13 DENSITIES

DENSITY	2.33054390+01	5.64432710+00	1.12362267+00	2.23299130-01	4.46059510-02	8.91820120-03	1.63914260-03	2.78646600-04
KAPPA(P)	2.74469750+01	5.03483190+00	1.33225473+00	3.82635890-01	2.16737350-01	1.92731160-01	1.89309980-01	1.88800900-01
KAPPA(R)	1.42602692+00	4.65893870-01	2.60639510-01	2.09862020-01	1.96039320-01	1.92300890-01	1.91358048-01	1.91165450-01

DENSITY	4.28686420-05	5.57292790-06	6.55636090-07	6.96613630-08	6.55636210-09
KAPPA(P)	1.88797350-01	1.88783580-01	1.88701690-01	1.88701500-01	1.88701500-01
KAPPA(R)	1.91125300-01	1.91118620-01	1.91117850-01	1.91117660-01	1.91117660-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1499.99930 13 DENSITIES

DENSITY	3.19144390+01	1.03623285+01	2.03525350+00	4.10206290-01	8.19454910-02	1.63837380-02	3.01129510-03	5.11906800-04
KAPPA(P)	1.27337631+01	2.76754040+00	6.66333920-01	2.62737980-01	1.99059990-01	1.90340060-01	1.89052220-01	1.88827760-01
KAPPA(R)	7.50021540-01	3.25557230-01	2.24965330-01	2.00758010-01	1.93541560-01	1.91665810-01	1.91235620-01	1.91139260-01
DENSITY	7.87545490-05	1.02340445-05	1.20449316-06	1.27976400-07	1.20448352-08			
KAPPA(P)	1.88788060-01	1.88782630-01	1.88781580-01	1.88781690-01	1.88781690-01			
KAPPA(R)	1.91120910-01	1.91118040-01	1.91117660-01	1.91117660-01	1.91117660-01			

THETA = 2249.99870 13 DENSITIES

DENSITY	9.52432410+01	1.89630490+01	3.77536470+00	7.53574490-01	1.50542320-01	3.00988290-02	5.53209890-03	9.40432280-04
KAPPA(P)	3.42475420+00	1.87407402+00	4.93588400-01	2.40789060-01	1.98836180-01	1.91876950-01	1.90580420-01	1.90337700-01
KAPPA(R)	4.58460970-01	2.60049990-01	2.09611800-01	1.96034220-01	1.92346270-01	1.91423890-01	1.91210790-01	1.91172140-01
DENSITY	1.44581530-04	1.88085320-05	2.21276000-06	2.35105450-07	2.21278280-08			
KAPPA(P)	1.90295720-01	1.90289060-01	1.90289100-01	1.90287920-01	1.90287920-01			
KAPPA(R)	1.91163730-01	1.91162390-01	1.91162200-01	1.91162200-01	1.91162200-01			

THETA = 3400.00050 13 DENSITIES

DENSITY	1.70499410+02	3.50336830+01	7.01256810+00	1.39978897+00	2.79641460-01	5.59105050-02	1.02762489-02	1.74691659-03
KAPPA(P)	4.10105400+00	9.57634810-01	3.24450600-01	2.13297790-01	1.94799780-01	1.91535900-01	1.90884630-01	1.90762890-01
KAPPA(R)	3.20380980-01	2.26082790-01	2.00647030-01	1.93662560-01	1.91842990-01	1.91419290-01	1.91313850-01	1.91292420-01
DENSITY	2.68755400-04	3.49381920-05	4.11035990-06	4.36725930-07	4.11036070-08			
KAPPA(P)	1.90741720-01	1.90738290-01	1.90737900-01	1.90737900-01	1.90737900-01			
KAPPA(R)	1.91288000-01	1.91287830-01	1.91287830-01	1.91287830-01	1.91287830-01			

THETA = 4999.99870 13 DENSITIES

DENSITY	3.15378010+02	6.24714680+01	1.24929437+01	2.49628660+00	4.98697240-01	9.97080380-02	1.83261360-02	3.11536490-03
KAPPA(P)	1.97541439+00	5.25274550-01	2.47492500-01	2.00540510-01	1.92584160-01	1.91110780-01	1.90810020-01	1.90753740-01
KAPPA(R)	2.50928040-01	2.09780610-01	1.96184250-01	1.92501560-01	1.91566360-01	1.91359960-01	1.91308680-01	1.91298540-01
DENSITY	4.79284610-04	6.23069860-05	7.33025740-06	7.78840180-07	7.33025860-08			
KAPPA(P)	1.90744010-01	1.90742490-01	1.90742290-01	1.90742290-01	1.90742290-01			
KAPPA(R)	1.91296020-01	1.91296440-01	1.91296440-01	1.91296440-01	1.91296440-01			

THETA = 6999.99890 13 DENSITIES

DENSITY	5.24344300+02	1.03474612+02	2.06941690+01	4.13507710+00	8.26091770-01	1.65146370-01	3.03573080-02	5.16060740-03
KAPPA(P)	1.07437961+00	3.50418900-01	2.17644130-01	1.95526960-01	1.91662360-01	1.90912890-01	1.90760230-01	1.90731080-01
KAPPA(R)	2.30108810-01	2.01977090-01	1.94053560-01	1.91935670-01	1.91431350-01	1.91311750-01	1.91284500-01	1.91279410-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 9999.99690 CONTINUED

DENSITY	7.93935780-04	1.03211636-04	1.21424862-05	1.29013980-06	1.21424880-07
KAPPA(P)	1.90726040-01	1.90725890-01	1.90725890-01	1.90725890-01	1.90725890-01
KAPPA(R)	1.91279460-01	1.91278270-01	1.91278270-01	1.91278270-01	1.91278270-01

THETA = 9999.99520 13 DENSITIES

DENSITY	9.91900980+02	1.76679950+02	3.53541870+01	7.06048670+00	1.41029950+00	2.81996390-01	5.18341550-02	8.81150480-03
KAPPA(P)	6.03808390-01	2.63239240-01	2.03127790-01	1.93030510-01	1.91203300-01	1.90835590-01	1.90760610-01	1.90746600-01
KAPPA(R)	2.13003600-01	1.97192270-01	1.92755250-01	1.91617510-01	1.91375080-01	1.91313080-01	1.91299890-01	1.91297080-01
DENSITY	1.35562191-03	1.76230640-04	2.07330820-05	2.20299100-06	2.07330850-07			
KAPPA(P)	1.90744390-01	1.90744010-01	1.90743820-01	1.90743820-01	1.90743820-01			
KAPPA(R)	1.91296820-01	1.91296820-01	1.91296820-01	1.91296820-01	1.91296820-01			

1 DIANE/NOSCT CH2 TEMP(100.-2250.) 11 FREQ. CI/MY 11/18/66 000000 MATERL = 2101 NX = 369

GREY ABSORPTION COEFFICIENTS 9 TEMPERATURES

THETA = 99.99998 13 DENSITIES

DENSITY	1.09662099+00	2.01927610-01	3.70605570-02	7.13851890-03	1.41194511-03	2.81581420-04	5.17297800-05	8.79300890-06
KAPPA(P)	1.04591759+04	4.07342670+03	1.05769460+03	2.14156690+02	4.24911570+01	8.34640070+00	1.69217890+00	4.50497830-01
KAPPA(R)	3.43276020+03	1.36356100+03	3.65051310+02	6.31215330+01	9.77154870+00	1.93619264+00	6.53206400-01	3.27952400-01
DENSITY	1.35275144-06	1.75856070-07	2.16490810-08	2.19021560-09	2.06890840-10			
KAPPA(P)	2.44187470-01	2.09836840-01	2.05267970-01	2.04738240-01	2.04681320-01			
KAPPA(R)	1.72460080-01	1.23306891-01	1.15456435-01	1.14495933-01	1.14392243-01			

THETA = 149.99995 13 DENSITIES

DENSITY	1.84109792+00	3.44995810-01	6.59228610-02	1.29923187-02	2.58839850-03	5.17067570-04	9.50257240-05	1.61535630-05
KAPPA(P)	4.88149050+03	1.35178730+03	3.17239800+02	6.24972190+01	1.25617185+01	2.65760220+00	6.21845200-01	2.37040480-01
KAPPA(R)	1.03020490+03	3.92602240+02	1.10987031+02	2.22357860+01	4.24878470+00	9.51150100-01	2.49971080-01	8.22472780-02
DENSITY	2.46514390-06	3.23068970-07	3.60083500-08	4.03834950-09	3.80083570-10			
KAPPA(P)	1.69459480-01	1.58884460-01	1.57569130-01	1.57414000-01	1.57397310-01			
KAPPA(R)	4.82863200-02	4.27070190-02	4.19684130-02	4.18803310-02	4.18708670-02			

THETA = 224.99990 13 DENSITIES

DENSITY	3.19426630+00	6.13342540-01	1.20182605-01	2.38244950-02	4.75330070-03	9.49835290-04	1.74570660-04	2.96760580-05
KAPPA(P)	1.77367680+03	4.86015710+02	1.32099309+02	2.08687950+01	4.32415600+00	9.08195500-01	2.50937340-01	1.27855570-01
KAPPA(R)	1.79629960+02	6.52836740+01	1.59658168+01	3.48918430+00	7.34015590-01	1.60596060-01	4.11476280-02	1.83773560-02
DENSITY	4.56551490-06	5.93517030-07	6.98252670-08	7.41893780-09	6.98252790-10			
KAPPA(P)	1.06108725-01	1.02678143-01	1.03803977-01	1.03750635-01	1.03744928-01			
KAPPA(R)	1.43917526-02	1.37594559-02	1.41053235-02	1.40953826-02	1.40943115-02			

THETA = 340.00012 13 DENSITIES

DENSITY	5.68445210+00	1.12375043+00	2.22687910-01	4.42295570-02	8.82845750-03	1.76433582-03	3.24275230-04	5.51251820-05
KAPPA(P)	7.16495600+02	1.67394920+02	3.50554900+01	7.17351660+00	1.50566790+00	3.52955380-01	1.14408773-01	6.92964230-02
KAPPA(R)	4.44692070+01	1.17495152+01	2.70088740+00	5.80395450-01	1.23381651-01	2.87579500-02	9.15341750-03	5.46157558-03
DENSITY	8.48076480-06	1.10250027-06	1.29705420-07	1.37812086-08	1.29705461-09			
KAPPA(P)	6.15084450-02	6.02776430-02	6.01153530-02	6.00960000-02	6.00938980-02			
KAPPA(R)	4.81967400-03	4.71800140-03	4.70458840-03	4.70298910-03	4.70281500-03			

THETA = 499.99993 13 DENSITIES

DENSITY	1.00535519+01	1.99709713+00	3.96734250-01	7.87951370-02	1.57377650-02	3.14639480-03	5.78295250-04	9.83074330-05
KAPPA(P)	9.92020780+01	3.33760630+01	7.29496940+00	1.55277708+00	3.35886830-01	5.56830230-02	2.05379680-02	1.39368066-02
KAPPA(R)	4.90612480+00	1.12900079+00	2.46877510-01	5.26643250-02	1.15066291-02	2.59627640-03	8.50027850-04	5.31536850-04

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 499.99993 CONTINUED

DENSITY	1.51241169-05	1.96613680-06	2.31309330-07	2.45766300-08	2.31309400-09
KAPPA(P)	1.27964050-02	1.26089045-02	1.25849708-02	1.25821140-02	1.25818125-02
KAPPA(R)	4.74836040-04	4.65859260-04	4.64575150-04	4.64534390-04	4.64519050-04

THETA = 699.99976 13 DENSITIES

DENSITY	1.65943020+01	3.30304570+00	6.56851770-01	1.30509660-01	2.60689850-02	5.21198240-03	9.57946140-04	1.62846420-04
KAPPA(P)	5.35150000+01	1.20014679+01	2.59808330+00	5.49994050-01	1.21910147-01	3.46058000-02	1.66436590-02	1.32732972-02
KAPPA(R)	2.64655420+00	5.93405320-01	1.27843420-01	2.73439490-02	5.87176870-03	1.55382756-03	6.65418770-04	4.98719370-04
DENSITY	2.50531760-05	3.25691540-06	3.83165070-07	4.07113110-08	3.83165180-09			
KAPPA(P)	1.26982363-02	1.25956219-02	1.25934099-02	1.25819632-02	1.25817997-02			
KAPPA(R)	4.69782350-04	4.65201940-04	4.64598020-04	4.64526030-04	4.64518140-04			

THETA = 999.99967 13 DENSITIES

DENSITY	2.82453620+01	5.63235130+00	1.12123829+00	2.22825120-01	4.45113080-02	8.89927950-03	1.63566309-03	2.78055470-04
KAPPA(P)	2.75059420+01	6.04063410+00	1.29046960+00	2.77508970-01	6.63027440-02	2.33869050-02	1.45732736-02	1.29208808-02
KAPPA(R)	1.36318183+00	2.96591160-01	6.36654030-02	1.35672025-02	3.12148330-03	9.98930860-04	5.63006710-04	4.81279220-04
DENSITY	4.27774270-05	5.56107070-06	6.54241060-07	6.95131580-08	6.54247720-09			
KAPPA(P)	1.26341008-02	1.25687843-02	1.25829061-02	1.25820893-02	1.25820136-02			
KAPPA(R)	4.67097300-04	4.64852690-04	4.64556680-04	4.64521370-04	4.64517660-04			

THETA = 1499.99930 13 DENSITIES

DENSITY	5.16042910+01	1.03403422+01	2.05089150+00	4.09335640-01	8.17715420-02	1.63489770-02	3.00490300-03	5.10820150-04
KAPPA(P)	1.27594963+01	2.75213500+00	5.62447390-01	1.30943280-01	3.65140190-02	1.73888340-02	1.34675799-02	1.27329528-02
KAPPA(R)	6.30659050-01	1.35949740-01	2.91421700-02	6.31835130-03	1.64815968-03	7.02255000-04	5.08303440-04	4.71967248-04
DENSITY	7.85873410-05	1.02163626-05	1.20192044-06	1.27704100-07	1.20192067-08			
KAPPA(P)	1.26055431-02	1.25853461-02	1.25826802-02	1.25823660-02	1.25823405-02			
KAPPA(R)	4.65664420-04	4.64666310-04	4.64534860-04	4.64519520-04	4.64517660-04			

THETA = 2249.99670 13 DENSITIES

DENSITY	9.54810780+01	1.68230270+01	3.76735430+00	7.51975150-01	1.50222910-01	3.00349370-02	5.52036130-03	9.38436840-04
KAPPA(P)	8.43636040+00	1.83305814+00	3.87970720-01	9.00683920-02	2.94196990-02	1.71668170-02	1.46578687-02	1.41080673-02
KAPPA(R)	2.89965960-01	6.29885060-02	1.33161199-02	3.07615760-03	9.91416320-04	5.70222460-04	4.83977098-04	4.67827950-04
DENSITY	1.44374400-04	1.87686950-05	2.20807390-06	2.34607950-07	2.20807460-08			
KAPPA(P)	1.41065431-02	1.40937058-02	1.40920007-02	1.40918032-02	1.40917748-02			
KAPPA(R)	4.65027000-04	4.64884008-04	4.64528980-04	4.64518580-04	4.64517660-04			

1100302 DIANE CARBON PHENOLIC 38 -- 12 FREQUENCIES -- JANUARY 21, 1966 MATERL = 1115 NK = 870

GREY ABSORPTION COEFFICIENTS 23 TEMPERATURES

THETA = .12915 12 DENSITIES

DENSITY	1.10916457-01	3.69182230-02	1.10689656-02	3.68774540-03	1.10563527-03	3.68359950-04	1.10436493-04	3.67890300-05
KAPPA(P)	1.12538534-05	1.78322840-05	2.95064990-05	4.65970340-05	7.71954540-05	1.22123230-04	2.01851150-04	3.19500950-04
KAPPA(R)	9.58679930-07	1.59346452-06	2.79214620-06	4.68193090-06	8.30543910-06	1.41117897-05	2.54447780-05	4.39481550-05
DENSITY	1.10277629-05	3.67263950-06	1.10044048-06	3.66341490-07				
KAPPA(P)	5.29789940-04	8.42817620-04	1.40835914-03	2.26556750-03				
KAPPA(R)	8.07930490-05	1.42084300-04	2.66086280-04	4.74964750-04				

THETA = .17434 12 DENSITIES

DENSITY	8.26792970-02	2.75988820-02	8.26934490-03	2.75284600-03	8.24428660-04	2.74280290-04	8.20657350-05	2.72706300-05
KAPPA(P)	1.20034642-02	1.88163330-02	3.10930800-02	4.96433910-02	8.38454570-02	1.36705670-01	2.36733560-01	3.94765200-01
KAPPA(R)	2.30812440-03	3.92711590-03	6.99171090-03	1.17593100-02	2.06134810-02	3.41180060-02	5.86692230-02	9.53129110-02
DENSITY	8.14423720-06	2.69988880-06	8.03490900-07	2.65195120-07				
KAPPA(P)	6.96393410-01	1.18313652+00	2.11485650+00	3.58604520+00				
KAPPA(R)	1.60596340-01	2.56237630-01	4.23861300-01	6.65566320-01				

THETA = .21542 12 DENSITIES

DENSITY	6.59525430-02	2.19321870-02	6.55785640-03	2.17727760-03	6.49368660-04	2.14897380-04	6.37800600-05	2.09808600-05
KAPPA(P)	1.42338694+00	2.23909540+00	3.70532130+00	5.89135510+00	9.80428930+00	1.55461028+01	2.55789560+01	3.99480540+01
KAPPA(R)	1.62343630-01	2.59035540-01	4.30382470-01	6.81592030-01	1.12332606+00	1.76483111+00	2.88028710+00	4.47497148+00
DENSITY	6.17069660-06	2.00573500-06	5.77706430-07	1.81828960-07				
KAPPA(P)	6.46372460+01	1.01604719+02	1.70732830+02	2.85037260+02				
KAPPA(R)	7.19367520+00	1.10023619+01	1.73900810+01	2.625[illegible]300+01				

THETA = .25651 12 DENSITIES

DENSITY	5.44608760-02	1.80449400-02	5.36799940-03	1.77052359-03	5.22706750-04	1.70698900-04	4.95662700-05	1.57952710-05
KAPPA(P)	2.73194790+01	4.24849530+01	6.06123590+01	1.05253314+02	1.66622360+02	2.52451700+02	4.01762040+02	6.28515008+02
KAPPA(R)	2.64152590+00	4.15474060+00	6.79753470+00	1.05731734+01	1.70324440+01	2.61709490+01	4.18511790+01	6.45461170+01
DENSITY	4.30772570-06	1.31417693-06	3.35816850-07	9.53129840-08				
KAPPA(P)	1.06693990+03	1.78838800+03	3.16750640+03	5.03853130+03				
KAPPA(R)	1.04959620+02	1.65274870+02	2.69697230+02	4.00282200+02				

THETA = .30469 12 DENSITIES

DENSITY	4.59119430-02	1.51210123-02	4.45232000-03	1.44794493-03	4.17101920-04	1.31260070-04	3.56379350-05	1.03450751-05
KAPPA(P)	1.94742650+02	2.95509190+02	4.62899480+02	6.95193340+02	1.09643570+03	1.69756460+03	2.82685470+03	4.57595130+03
KAPPA(R)	2.22450000+01	3.45348850+01	5.55959280+01	8.56063920+01	1.38212170+02	2.16902930+02	3.62842900+02	5.86864558+02

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = .30460 CONTINUED

DENSITY	2.53631060-06	6.92747740-07	1.67346390-07	4.57671190-08
KAPPA(P)	7.48712220+03	1.03943738+04	1.19358275+04	9.94464990+03
KAPPA(R)	9.57456200+02	1.33814550+03	1.36082520+03	1.31813080+03

THETA = .34468 12 DENSITIES

DENSITY	3.91353150-02	1.27347606-02	3.57012330-03	1.15494799-03	3.12936580-04	9.00640090-05	2.14883440-05	5.63789390-06
KAPPA(P)	7.74738150+02	1.16226960+03	1.12342160+03	2.78526970+03	4.52955910+03	7.13887130+03	1.12378177+04	1.45350745+04
KAPPA(R)	1.16950407+02	1.80982430+02	2.94108450+02	4.63603650+02	7.79084850+02	1.26540810+03	2.06951580+03	2.79771970+03
DENSITY	1.32393795-06	3.71357770-07	1.01510880-07	3.28899090-08				
KAPPA(P)	1.39228958+04	8.91419280+03	3.59762750+03	1.30364570+03				
KAPPA(R)	2.82829070+03	1.87974220+03	7.63841230+02	2.71844430+02				

THETA = .38776 12 DENSITIES

DENSITY	3.32509170-02	1.05975759-02	2.91886640-03	8.56008720-04	2.06159600-04	5.28839970-05	1.20589922-05	3.35653970-06
KAPPA(P)	2.24414510+03	3.40241220+03	5.16751720+03	8.52373530+03	1.35993862+04	1.84402290+04	1.83963930+04	1.20426517+04
KAPPA(R)	4.43101980+02	6.95638330+02	1.16282760+03	1.88228170+03	3.14358730+03	4.47870810+03	4.74046220+03	3.22807060+03
DENSITY	9.10363410-07	2.93408530-07	8.69441470-08	2.88718150-09				
KAPPA(P)	5.02102760+03	1.85472180+03	5.75929430+02	1.94641600+02				
KAPPA(R)	1.35599390+03	4.95501300+02	1.52552680+02	5.11718710+01				

THETA = .43085 12 DENSITIES

DENSITY	2.60210290-02	8.51224150-03	2.15470820-03	5.65613260-04	1.24173600-04	3.28848000-05	8.52080280-06	2.68078750-06
KAPPA(P)	5.52301900+03	8.56577550+03	1.39868089+04	2.09201890+04	2.60871970+04	2.14206330+04	1.08439207+04	4.38024480+03
KAPPA(R)	1.35496450+03	2.13713190+03	3.51873560+03	5.61002190+03	7.29788570+03	6.18214100+03	3.15565060+03	1.26593960+03
DENSITY	7.86065760-07	2.60151950-07	7.77241520-08	2.57868830-08				
KAPPA(P)	1.41473640+03	4.83523510+02	1.48232190+02	5.13302360+01				
KAPPA(R)	4.06566510+02	1.38159660+02	4.18294230+01	1.40468755+01				

THETA = .47393 12 DENSITIES

DENSITY	2.26269190-02	6.43550160-03	1.45613446-03	3.61362120-04	8.56715290-05	2.54906210-05	7.25659440-06	2.37716970-06
KAPPA(P)	1.23889464+04	1.94801230+04	3.00554700+04	3.51823560+04	2.59259580+04	1.30692829+04	4.71238760+03	1.66996830+03
KAPPA(R)	3.36862630+03	5.44899480+03	8.61034750+03	1.02659708+04	7.61130530+03	3.79803810+03	1.35930650+03	4.80073840+02
DENSITY	7.07489210-07	2.34361750-07	6.95374910-08	2.28571950-08				
KAPPA(P)	5.16987000+02	1.60544940+02	5.91034890+01	2.17766870+01				
KAPPA(R)	1.47562230+02	4.98520670+01	1.52186247+01	5.16600670+00				

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = .51702 12 DENSITIES

DENSITY	1.77528370-02	4.56777070-03	9.44595210-04	2.63865780-04	6.98996450-05	2.22048470-05	6.52675940-06	2.15547080-06
KAPPA(P)	2.55552990+04	3.64197120+04	4.34763990+04	3.55466040+04	1.69850680+04	6.75285000+03	2.18799300+03	7.63482320+02
KAPPA(R)	7.45561610+03	1.13216252+04	1.37536548+04	1.04222676+04	4.87380360+03	1.92382360+03	6.21173220+02	2.13447300+02
DENSITY	5.39486740-07	2.10222380-07	6.21012430-08	2.04476070-08				
KAPPA(P)	2.46423000+02	9.00621480+01	2.93819330+01	1.03107804+01				
KAPPA(R)	6.56271600+01	2.23778130+01	6.36434080+00	2.34833600+00				

THETA = .56610 12 DENSITIES

DENSITY	1.32018278-02	3.23193110-03	7.46003700-04	2.14903420-04	6.17053500-05	2.01019260-05	5.94714110-06	1.95601770-06
KAPPA(P)	4.60020540+04	5.90594590+04	4.21944900+04	2.01028540+04	9.89910810+03	3.60515400+03	1.15729410+03	4.17034920+02
KAPPA(R)	1.41449075+04	1.79380930+04	1.43537992+04	7.55209260+03	2.82467880+03	1.02810230+03	3.24663710+02	1.11917272+02
DENSITY	5.77071330-07	1.89740070-07	5.61016840-08	1.83543390-08				
KAPPA(P)	1.37127030+02	4.87858340+01	1.50521050+01	6.59958240+00				
KAPPA(R)	3.47187530+01	1.20138807+01	3.91634950+00	1.54894400+00				

THETA = .60519 12 DENSITIES

DENSITY	9.73575610-03	2.47258770-03	6.25061920-04	1.93614800-04	5.61131730-05	1.83882270-05	5.42062220-06	1.77857163-06
KAPPA(P)	7.03657350+04	6.70973580+04	3.37699160+04	1.71184120+04	5.87146760+03	2.11136510+03	6.91071320+02	2.49183600+02
KAPPA(R)	2.22369060+04	2.08302170+04	1.15646684+04	4.94788730+03	1.70962610+03	6.11999590+02	1.93916940+02	6.76447670+01
DENSITY	5.25611050-07	1.72546360-07	5.04693340-08	1.61992650-08				
KAPPA(P)	8.12710570+01	3.14695370+01	1.40158650+01	8.93574910+00				
KAPPA(R)	2.16558790+01	8.36779130+00	3.35976150+00	1.74872332+00				

THETA = .64627 12 DENSITIES

DENSITY	7.53135730-03	2.05929820-03	5.53073320-04	1.76134970-04	5.14953010-05	1.68476390-05	4.96399350-06	1.63119130-06
KAPPA(P)	8.56[illegible]+04	6.10348300+04	2.31302260+04	1.11833339+04	3.72696650+03	1.35002710+03	4.40623140+02	1.61785270+02
KAPPA(R)	[illegible]	1.93131190+04	[illegible]	3.34007980+03	1.12938660+03	4.05994549+02	1.31017130+02	4.82559900+01
DENSITY	[illegible]	[illegible]	[illegible]	1.39096251-08				
KAPPA(P)	6.17553[illegible]+01	3.31306883+01	2.24965050+01	1.79453310+01				
KAPPA(R)	1.76167430+01	8.26715130+00	4.39053010+00	2.95852240+00				

THETA = .68936 12 DENSITIES

DENSITY	6.23965760-03	1.80824239-03	5.02763850-04	1.61976400-04	4.74022940-05	1.55243630-05	4.58234380-06	1.50111863-06
KAPPA(P)	8.62409140+04	4.98762370+04	2.01200060+04	7.64351240+03	2.53601690+03	9.16076570+02	3.11970910+02	1.35493008+02
KAPPA(R)	2.93241920+04	1.57599927+04	6.12975430+03	2.39955840+03	8.15849540+02	2.98374650+02	1.02903322+02	4.28163408+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = .68936 CONTINUED

DENSITY	4.37276060-07	1.39514120-07	3.87862560-08	1.17114381-08
KAPPA(P)	7.34085190+01	5.40343510+01	4.29243900+01	3.31045260+01
KAPPA(R)	1.92295650+01	1.11450714+01	7.42061900+00	5.35087440+00

THETA = .86200 12 DENSITIES

DENSITY	1.46017471+01	4.47935180+00	1.66719070+00	2.94690840-01	3.73411260-02	5.10676070-03	5.37436460-04	6.69516410-05
KAPPA(P)	6.63603320+03	6.59904359+03	6.50606380+03	6.02853900+03	5.78636740+03	5.22113430+03	3.52434520+03	2.25986400+03
KAPPA(R)	2.53338290+02	2.52370920+02	2.52307840+02	2.51947310+02	2.50137300+02	2.44169830+02	2.26166160+02	1.96436640+02

DENSITY	7.03579430-06	1.60993800-07	1.03725808-08	9.78891960-10
KAPPA(P)	1.45306370+03	4.71297710+02	5.94319320+01	5.72418390+00
KAPPA(R)	1.53377450+02	5.46406530+01	7.38240880+00	7.53686970-01

THETA = 1.10000 12 DENSITIES

DENSITY	1.77573247+00	5.24595399-01	1.86655610-01	3.14473670-02	3.89691520-03	5.45422410-04	6.48859160-05	1.07425300-05
KAPPA(P)	3.05097000+04	3.00104200+04	2.97058690+04	2.76422280+04	2.58379570+04	2.28475690+04	1.45336209+04	7.47253730+03
KAPPA(R)	1.80278670+03	1.75869960+03	1.75441360+03	1.73555050+03	1.67058630+03	1.51339380+03	1.18015360+03	7.52017800+02

DENSITY	1.97468650-06	1.46140120-07	1.40717034-08	1.39677496-09
KAPPA(P)	2.88061750+03	3.00900590+02	2.69987340+01	2.62141430+00
KAPPA(R)	3.33742570+02	3.75712810+01	3.50825930+00	3.98960840-01

THETA = 1.38000 12 DENSITIES

DENSITY	4.45014080-01	1.23995819-01	4.29602650-02	7.20391980-03	9.63931840-04	1.65296450-04	2.96989170-05	7.74703850-06
KAPPA(P)	7.67032960+04	7.38654080+04	7.25549140+04	6.67360040+04	5.62409250+04	4.03804060+04	1.77508720+04	6.15518420+03
KAPPA(R)	8.37335530+03	7.55450930+03	7.44263280+03	7.04927440+03	6.00849740+03	4.24119340+03	2.08286570+03	8.15653780+02

DENSITY	2.07967470-06	1.97367160-07	1.90347430-08	1.55482949-09
KAPPA(P)	1.71433400+03	1.50310920+02	1.53539070+01	2.63856880+00
KAPPA(R)	2.46379790+02	2.29307770+01	3.11964740+00	7.53097930-01

THETA = 1.50000 12 DENSITIES

DENSITY	3.00201910-01	8.23999880-02	2.84974690-02	4.87351420-03	7.01254260-04	1.36049750-04	2.84716990-05	8.16054170-06
KAPPA(P)	9.89925610+04	9.41175630+04	9.14639310+04	8.12836310+04	6.27679560+04	4.05463040+04	1.63797312+04	5.14201330+03
KAPPA(R)	1.36920408+04	1.20841501+04	1.17721277+04	1.07438625+04	8.36607380+03	5.13445970+03	2.12975010+03	7.69553090+02

DENSITY	2.29609680-06	2.20515040-07	1.97147260-08	1.39273002-09
KAPPA(P)	1.37913250+03	1.26775774+02	1.71733710+01	3.95760970+00
KAPPA(R)	2.25545060+02	2.44448600+01	4.73887600+00	1.17131492+00

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA =   2.25000   12 DENSITIES

DENSITY	9.76039620-02	2.70743090-02	1.00996959-02	2.24286770-03	5.03322240-04	1.46224130-04	4.02621030-05	1.23210676-05
KAPPA(P)	1.66708140+05	1.41874760+05	1.23722931+05	8.65605880+04	4.71976780+04	2.21390850+04	8.26705100+03	3.46205920+03
KAPPA(R)	7.14247660+04	5.69369610+04	4.88446410+04	3.29826350+04	1.68539440+04	7.66760770+03	3.08374450+03	1.37626690+03
DENSITY	3.16201640-05	2.27367110-07	2.06572405-08	1.96671770-09				
KAPPA(P)	1.44805990+03	2.20392470+02	2.21531560+01	2.46680300+00				
KAPPA(R)	5.39406090+02	5.74278830+01	5.47542560+00	7.70750930-01				

THETA =   3.40002   12 DENSITIES

DENSITY	6.23291540-02	2.46433050-02	1.01586472-02	2.66625610-03	6.49576490-04	1.79300040-04	4.47956290-05	1.34034299-05
KAPPA(P)	1.55542300+05	1.33519110+05	1.16331592+05	9.40893280+04	6.94040120+04	3.67465610+04	1.33269022+04	4.46422070+03
KAPPA(R)	1.17113636+05	9.52633020+04	7.70184230+04	4.72732500+04	2.14356330+04	8.43883930+03	2.77942660+03	1.04150280+03
DENSITY	3.72479640-05	3.06392160-07	2.60382340-08	2.39903350-09				
KAPPA(P)	1.36758260+03	1.87327790+02	2.27223720+01	2.69109450+00				
KAPPA(R)	3.85245170+02	6.05627450+01	6.92619080+00	8.95509000-01				

THETA =   5.00001   12 DENSITIES

DENSITY	8.75303250-02	2.75404340-02	1.17104931-02	3.11430280-03	7.62719680-04	2.19857720-04	5.71392150-05	1.69270110-05
KAPPA(P)	1.47428690+05	1.31557580+05	1.20801004+05	1.00207667+05	6.80234620+04	3.52105130+04	1.29044800+04	4.56694590+03
KAPPA(R)	1.09409234+05	9.40422970+04	7.76448080+04	4.60599910+04	2.49143670+04	1.30044795+04	4.74036730+03	1.65537020+03
DENSITY	4.62377090-06	3.95505970-07	3.49446690-08	3.40677430-09				
KAPPA(P)	1.34277400+03	1.45813720+02	1.57368010+01	1.75270970+00				
KAPPA(R)	4.80222690+02	5.42585170+01	5.20161930+00	6.01414430-01				

THETA =   7.00000   12 DENSITIES

DENSITY	9.93456600-02	3.25561170-02	1.41194786-02	3.83042310-03	9.47873080-04	2.74047260-04	7.27115770-05	2.19751140-05
KAPPA(P)	1.22051690+05	1.08423480+05	1.00609677+05	9.37231000+04	5.90830840+04	2.72579350+04	9.15998620+03	2.99026770+03
KAPPA(R)	7.63970910+04	7.13105750+04	6.57950520+04	5.21719310+04	2.89261100+04	1.25505515+04	4.09339490+03	1.43849100+03
DENSITY	6.05213230-06	5.68025250-07	5.63096460-08	5.62637880-09				
KAPPA(P)	8.32269200+02	7.77633260+01	6.62519620+00	7.27308160-01				
KAPPA(R)	3.83168670+02	2.47515960+01	2.00541090+00	3.33644240-01				

THETA =   10.00005   12 DENSITIES

DENSITY	1.21823742-01	4.09169850-02	1.80640780-02	5.03475730-03	1.27932843-03	3.77734110-04	1.03308175-04	3.29036030-05
KAPPA(P)	8.63444630+04	7.89103750+04	7.40503070+04	6.10348300+04	3.27317200+04	1.27492776+04	3.51508840+03	1.02487910+03
KAPPA(R)	3.61560640+04	3.54826790+04	3.37251790+04	2.71464070+04	1.63573051+04	7.42323310+03	2.18941560+03	5.85110040+02

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA =   10,00005   CONTINUED

DENSITY	9.70082410-06	9.61568560-07	9.60689380-08	9.60578960-09
KAPPA(P)	2.71885420+02	2.35519820+01	2.30160100+00	3.42085050-01
KAPPA(R)	1.30409560+02	9.37878270+00	9.98480850-01	2.56932980-01

21 DIANE/SCAT FE-1GA THETA(50-10000) 10 FREQ C1/FCT 5-24-67 TRY 2 MATERL = 1026 NX = 720

GREY ABSORPTION COEFFICIENTS 18 TEMPERATURES

THETA = 50.00000 13 DENSITIES

DENSITY	8.23434060-01	1.63902920-01	3.22282780-02	6.13555960-03	1.13376195-03	2.11691190-04	3.71985790-05	6.22523110-06
KAPPA(P)	1.25485497+04	6.06178130+03	2.61292610+03	8.40121020+02	2.64516320+02	6.53582010+01	1.23571889+01	2.10156260+00
KAPPA(R)	4.91357690+03	2.69803220+03	1.19482730+03	4.66248590+02	1.40382650+02	3.12301810+01	6.05775940+00	1.03249120+00
DENSITY	9.54527400-07	1.23975740-07	1.45438164-08	1.51693497-09	1.36368560-10			
KAPPA(P)	4.12743067-01	1.53669050-01	1.20946255-01	1.19276733-01	1.24381476-01			
KAPPA(R)	2.64148190-02	1.41135330-01	1.19747610-01	1.17369757-01	1.22161787-01			

THETA = 69.99998 13 DENSITIES

DENSITY	1.32450605+00	2.60314430-01	4.85779780-02	9.03612380-03	1.71016921-03	3.32271920-04	6.04435940-05	1.01734422-05
KAPPA(P)	8.22362940+03	4.37305430+03	1.67822220+03	5.86022950+02	1.31936130+02	2.62545940+01	4.71723100+00	9.36977080-01
KAPPA(R)	2.24394770+03	1.80619610+03	1.13142470+03	3.92525300+02	8.42356260+01	1.64469970+01	2.81284650+00	6.07981200-01
DENSITY	1.51940767-06	1.87484450-07	2.06725330-08	2.03438980-09	1.78784500-10			
KAPPA(P)	2.70341310-01	1.54130590-01	1.40101790-01	1.47291300-01	1.57145370-01			
KAPPA(R)	2.20535650-01	1.46102030-01	1.37071440-01	1.44528970-01	1.54279710-01			

THETA = 99.99998 12 DENSITIES

DENSITY	4.04181640-01	7.59531330-02	1.45211222-02	2.80199120-03	5.36661520-04	9.33027520-05	1.47865888-05	2.10370620-06
KAPPA(P)	2.70212550+03	9.79419420+02	2.23682570+02	5.54007950+01	1.46444287+01	3.72465410+00	9.38554600-01	3.06994020-01
KAPPA(R)	8.39337090+02	4.41512790+02	1.35262440+02	3.58642140+01	8.97061270+00	2.03868680+00	5.12136490-01	2.26450250-01
DENSITY	2.54954700-07	2.86157120-08	2.95242260-09	2.75423860-10				
KAPPA(P)	1.87219990-01	1.71483020-01	1.73039560-01	1.74129670-01				
KAPPA(R)	1.73503410-01	1.67132390-01	1.69732940-01	1.70947980-01				

THETA = 149.99995 11 DENSITIES

DENSITY	1.27654220-01	2.37112180-02	4.35502480-03	8.00346340-04	1.37133870-04	2.22570890-05	3.33622720-06	4.30215370-07
KAPPA(P)	6.22406210+02	1.93083740+02	6.27531620+01	1.47080354+01	3.58398740+00	8.41024150-01	2.84712610-01	1.88477990-01
KAPPA(R)	2.10463660+02	7.77650510+01	2.30007770+01	5.94087230+00	1.40200071+00	4.16320280-01	2.14954050-01	1.78134570-01
DENSITY	5.03496460-09	5.37009660-09	5.05410620-10					
KAPPA(P)	1.75928960-01	1.74456130-01	1.74296390-01					
KAPPA(R)	1.72419640-01	1.71413070-01	1.71151010-01					

THETA = 224.99990 13 DENSITIES

DENSITY	3.92392940+00	1.09257642+00	1.98633850-01	3.61062610-02	6.71507020-03	1.29099893-03	2.33362630-04	3.94995990-05
KAPPA(P)	2.65292730+03	1.41671310+03	4.21503440+02	1.35154150+02	3.67659060+01	7.66675910+00	1.50610235+00	3.90411370-01
KAPPA(R)	1.09455700+03	5.37003680+02	1.53720550+02	4.94596880+01	1.36395677+01	2.93628450+00	6.56894530-01	2.63312960-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99990 CONTINUED

DENSITY	6.07189350-06	7.59236370-07	9.28500670-08	9.86522500-09	9.28491540-10
KAPPA(P)	2.09443970-01	1.79166810-01	1.74791570-01	1.74335270-01	1.74286280-01
KAPPA(R)	1.93673600-01	1.77123330-01	1.71944760-01	1.71206130-01	1.71124990-01

THETA = 340.00012 13 DENSITIES

DENSITY	9.50176690+00	1.74153496+00	3.20625020-01	6.00113410-02	1.18455620-02	2.35090248-03	4.31371450-04	7.33868920-05
KAPPA(P)	1.71580360+03	7.98116800+02	2.93910982+02	5.76248530+01	1.18688932+01	2.42558358+00	5.76387610-01	2.41952460-01
KAPPA(R)	6.49819000+02	3.23804510+02	1.33863220+02	3.09850850+01	5.70420700+00	1.17098701+00	3.86801630-01	2.25634690-01
DENSITY	1.12771725-05	1.45590183-06	1.72349770-07	1.82161030-08	1.67668032-09			
KAPPA(P)	1.84791690-01	1.75611700-01	1.74568510-01	1.75346720-01	1.79280260-01			
KAPPA(R)	1.82270570-01	1.72635820-01	1.71417870-01	1.72158790-01	1.76020120-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.52232366+01	2.84563970+00	5.43006710-01	1.06144702-01	2.09923130-02	4.18569300-03	7.68328670-04	1.30059968-04
KAPPA(P)	9.07516710+02	4.37739600+02	9.12466200+01	1.84539973+01	3.84357140+00	8.88383910-01	3.09619230-01	2.02317710-01
KAPPA(R)	1.88382760+02	1.03399998+02	3.59196670+01	8.73971830+00	1.99729683+00	5.62415880-01	2.57777968-01	1.89825518-01
DENSITY	1.96927310-05	2.49171340-06	2.86341700-07	3.01992130-08	2.83952280-09			
KAPPA(P)	1.85133140-01	1.84599030-01	1.87534590-01	1.88636190-01	1.88784710-01			
KAPPA(R)	1.77925210-01	1.80021490-01	1.83885500-01	1.85180730-01	1.85350250-01			

THETA = 699.99976 13 DENSITIES

DENSITY	2.39615660+01	4.53438160+00	8.44541450-01	1.74580730-01	3.45733200-02	6.81631690-03	1.22314606-03	2.02954660-04
KAPPA(P)	5.10036340+02	1.52332540+02	3.55078560+01	7.75098520+00	2.01232600+00	7.48721040-01	3.73456890-01	2.36073750-01
KAPPA(R)	7.05989290+01	2.67915610+01	9.08603810+00	2.37867610+00	7.14076190-01	3.20295590-01	2.18307430-01	1.92377430-01
DENSITY	3.08488030-05	3.99942510-06	4.70340040-07	4.99716600-08	4.70316570-09			
KAPPA(P)	1.97460440-01	1.90006110-01	1.88905190-01	1.88813600-01	1.88811140-01			
KAPPA(R)	1.87085410-01	1.85943370-01	1.85556840-01	1.85399930-01	1.85396960-01			

THETA = 999.99967 13 DENSITIES

DENSITY	3.96113600+01	7.61190120+00	1.49044135+00	2.90300700-01	5.63252710-02	1.10361392-02	2.01226370-03	3.41437140-04
KAPPA(P)	2.29455010+02	7.99932260+01	1.79822460+01	6.20272060+00	2.31129750+00	7.91794810-01	3.85382568-01	2.08533200-01
KAPPA(R)	4.14739270+01	1.41736413+01	3.76977380+00	1.07879430+00	4.48175858-01	2.73798730-01	2.12287448-01	1.95181570-01
DENSITY	5.25106300-05	6.82601220-06	8.03057128-07	8.53240100-08	8.03049318-09			
KAPPA(P)	1.91305020-01	1.89164938-01	1.89054870-01	1.89045220-01	1.89844090-01			
KAPPA(R)	1.88391138-01	1.86068940-01	1.85967198-01	1.85961240-01	1.85960688-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1499.99930 13 DENSITIES

DENSITY	6.90218450+01	1.35637255+01	2.63755700+00	5.04042840-01	1.00528376-01	2.00771400-02	3.68870430-03	6.27016340-04
KAPPA(P)	1.41416490+02	5.04884190+01	1.62759750+01	4.63270980+00	1.19455148+00	3.78115450-01	2.18275110-01	1.93209540-01
KAPPA(R)	3.96932630+01	1.27307684+01	3.26861050+00	9.22924600-01	4.02195170-01	2.63841690-01	2.08528200-01	1.98748210-01
DENSITY	9.84623350-05	1.25400882-05	1.47529891-06	1.56750570-07	1.47529934-08			
KAPPA(P)	1.90914030-01	1.90711390-01	1.90684700-01	1.90691460-01	1.90681070-01			
KAPPA(R)	1.88893100-01	1.88794340-01	1.88701310-01	1.88779900-01	1.88779610-01			

THETA = 2249.99870 13 DENSITIES

DENSITY	1.23156676+02	2.38581280+01	4.66630240+00	9.24270160-01	1.04418060-01	3.68649140-02	6.77592080-03	1.15188336-03
KAPPA(P)	8.80528600+01	2.85102590+01	7.59960280+00	1.73382472+00	4.77465670-01	2.35675360-01	1.99092650-01	1.94898770-01
KAPPA(R)	3.10022560+01	1.08483064+01	2.83210700+00	7.70400780-01	3.20401300-01	2.15915530-01	1.98867070-01	1.93515280-01
DENSITY	1.77212140-04	2.30376680-05	2.71030330-06	2.87969990-07	2.71030380-08			
KAPPA(P)	1.94284030-01	1.94202860-01	1.94192760-01	1.94191590-01	1.94191400-01			
KAPPA(R)	1.93196090-01	1.93161230-01	1.93156990-01	1.93156410-01	1.93156410-01			

THETA = 2499.99990 13 DENSITIES

DENSITY	1.42974730+02	2.77598020+01	5.45180090+00	1.09194417+00	2.15963900-01	4.31755040-02	7.93600750-03	1.34910082-03
KAPPA(P)	6.86501500+01	2.25860390+01	5.30503820+00	1.20062144+00	3.68173310-01	2.17627150-01	1.97007890-01	1.95457360-01
KAPPA(R)	2.33031630+01	8.49642060+00	1.95924361+00	5.56644430-01	2.68040280-01	2.05480530-01	1.95358100-01	1.94207520-01
DENSITY	2.07553380-04	2.69820160-05	3.17434280-06	3.37274060-07	3.17434330-08			
KAPPA(P)	1.95097680-01	1.95039920-01	1.95032310-01	1.95031340-01	1.95031340-01			
KAPPA(R)	1.94039020-01	1.94011850-01	1.94008370-01	1.94007980-01	1.94007780-01			

THETA = 2749.99940 13 DENSITIES

DENSITY	1.63627320+02	3.18905900+01	6.28033940+00	1.24766111+00	2.49135840-01	4.98103240-02	9.15566940-03	1.55644179-03
KAPPA(P)	5.69469410+01	1.74645520+01	4.01773370+00	9.65843560-01	3.12149200-01	2.09454240-01	1.96545950-01	1.94977910-01
KAPPA(R)	1.67512180+01	6.47515790+00	1.54332841+00	4.61066770-01	2.45154410-01	2.01784290-01	1.95322540-01	1.94615000-01
DENSITY	2.39452160-04	3.11287130-05	3.66222390-06	3.89111500-07	3.66222490-08			
KAPPA(P)	1.94709789-01	1.94736670-01	1.94732390-01	1.94731810-01	1.94731810-01			
KAPPA(R)	1.94543590-01	1.94532120-01	1.94530760-01	1.94530560-01	1.94530560-01			

THETA = 3000.00100 13 DENSITIES

DENSITY	1.85947790+02	3.62277700+01	7.14905370+00	1.42127504+00	2.83855490-01	5.67541790-02	1.04321071-02	1.77343674-03
KAPPA(P)	5.37922610+01	1.45622415+01	3.28520470+00	7.65773070-01	2.82114290-01	2.06580730-01	1.96836860-01	1.95543770-01
KAPPA(R)	1.37773366+01	4.65735170+00	1.18982101+00	3.89738640-01	2.30895510-01	2.00154040-01	1.95621030-01	1.95070150-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 3000.00100 CONTINUED

DENSITY	2.72835920-04	3.54687010-05	4.17277190-06	4.43357260-07	4.17277370-08
KAPPA(P)	1.95319810-01	1.95284260-01	1.95279580-01	1.95278990-01	1.95278990-01
KAPPA(R)	1.94971060-01	1.94955290-01	1.94953150-01	1.94952950-01	1.94952760-01

THETA = 3400.00050 13 DENSITIES

DENSITY	2.22616810+02	4.35697440+01	8.61710330+00	1.71440775+00	3.42461850-01	6.84746960-02	1.25865815-02	2.13969490-03
KAPPA(P)	4.24357640+01	1.04203852+01	2.31576290+00	5.84120600-01	2.53210530-01	2.03877290-01	1.97063950-01	1.96016590-01
KAPPA(R)	8.32713100+00	2.69516090+00	7.54616200-01	3.10900300-01	2.16917540-01	1.98739970-01	1.95857090-01	1.95416520-01
DENSITY	3.29183240-04	4.27936870-05	5.03458280-06	5.34924640-07	5.03458370-08			
KAPPA(P)	1.95962050-01	1.95936040-01	1.95932510-01	1.95932120-01	1.95932120-01			
KAPPA(R)	1.95424920-01	1.95414370-01	1.95413000-01	1.95412810-01	1.95412810-01			

THETA = 4999.99670 10 DENSITIES

DENSITY	3.92145900+02	7.72306940+01	1.53447283+01	3.05633040+00	6.10684330-01	1.22112444-01	2.24461990-02	3.81582660-03
KAPPA(P)	1.66583900+01	3.62889060+00	9.27543170-01	3.14449740-01	2.13271980-01	1.98346650-01	1.95770150-01	1.95042650-01
KAPPA(R)	1.74394519+00	5.66216300-01	3.01162590-01	2.21325460-01	2.00413810-01	1.95957590-01	1.95067620-01	1.94792770-01
DENSITY	5.87049160-04	7.63163950-05						
KAPPA(P)	1.94963460-01	1.94951200-01						
KAPPA(R)	1.94762150-01	1.94757510-01						

THETA = 6999.99690 13 DENSITIES

DENSITY	6.45964760+02	1.27731315+02	2.54052530+01	5.06218380+00	1.01157251+00	2.02278460-01	3.71821670-02	6.32092330-03
KAPPA(P)	7.34033130+00	1.58159208+00	4.64959630-01	2.37374070-01	2.01033640-01	1.95086930-01	1.93922050-01	1.93702850-01
KAPPA(R)	6.26364060-01	3.02741490-01	2.26349280-01	2.02255000-01	1.95615360-01	1.94065610-01	1.93707880-01	1.93636420-01
DENSITY	9.72448950-04	1.26418350-04	1.48727494-05	1.58023029-06	1.48727510-07			
KAPPA(P)	1.93664690-01	1.93658690-01	1.93657910-01	1.93657910-01	1.93657910-01			
KAPPA(R)	1.93623630-01	1.93621900-01	1.93621700-01	1.93621700-01	1.93621700-01			

THETA = 9999.99020 13 DENSITIES

DENSITY	1.09944950+03	2.16915730+02	4.32764220+01	8.64292440+00	1.72720292+00	3.45383120-01	6.34073890-02	1.07927790-02
KAPPA(P)	1.83567468+00	4.92219600-01	2.43174490-01	1.99397490-01	1.91801740-01	1.89526580-01	1.89246100-01	1.89193490-01
KAPPA(R)	2.56715710-01	2.10407320-01	1.96761680-01	1.92872490-01	1.91860060-01	1.91042760-01	1.91002260-01	1.90994240-01
DENSITY	1.66042619-03	2.15855360-04	2.53947030-05	2.69818830-06	2.53947070-07			
KAPPA(P)	1.89184410-01	1.89182900-01	1.89182710-01	1.89182710-01	1.89182710-01			
KAPPA(R)	1.90992710-01	1.90992520-01	1.90992520-01	1.90992520-01	1.90992520-01			

0 GREY DIANE LIVERMORE IRON DATA, BINA IRONIC APRIL 5, 1966 MATERL = 3026 NX = 010

GREY ABSORPTION COEFFICIENTS 10 TEMPERATURES

THETA = 49.99965 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	2.95998030+03	4.98700040+03	5.55797930+03	4.58098790+03	3.81799200+03	1.47800720+03	7.81996270+02
KAPPA(R)	2.95998030+03	4.98700040+03	5.55797930+03	4.58098790+03	3.81799200+03	1.47800720+03	7.81996270+02

THETA = 75.00014 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	3.07100420+03	3.94301090+03	3.34001290+03	2.33199620+03	1.77500750+03	6.59802110+02	3.47999130+02
KAPPA(R)	3.07100420+03	3.94301090+03	3.34001290+03	2.33199620+03	1.77500750+03	6.59802110+02	3.47999130+02

THETA = 99.99998 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	3.09799360+03	2.85400900+03	2.29000650+03	1.40499630+03	1.05699990+03	3.73698740+02	1.96999250+02
KAPPA(R)	3.09799360+03	2.85400900+03	2.29000650+03	1.40499630+03	1.05699990+03	3.73698740+02	1.96999250+02

THETA = 150.00069 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	2.61298670+03	1.91472430+03	1.55200040+03	6.97498220+02	4.81102330+02	1.50000690+02	7.72996920+01
KAPPA(R)	[illegible]	[illegible]	[illegible]	[illegible]	4.81102330+02	1.50000690+02	7.72996920+01

THETA = 200.00052 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	2.11900090+03	1.58799890+03	1.23200420+03	5.00501180+02	2.83899390+02	8.86698540+01	3.89999340+01
KAPPA(R)	2.11900090+03	1.58799890+03	1.23200420+03	5.00501180+02	2.83899390+02	8.86698540+01	3.89999340+01

THETA = 299.99925 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	9.44900790+02	7.63001460+02	6.25999730+02	2.10399890+02	1.07499906+02	1.86799350+01	8.11001710+00
KAPPA(R)	9.44900790+02	7.63001460+02	6.25999730+02	2.10399890+02	1.07499906+02	1.86799350+01	8.11001710+00

THETA = 399.99817 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	4.02380750+02	2.58700220+02	1.70000260+02	4.91998200+01	2.55999390+01	5.25999460+00	2.68999940+00
KAPPA(R)	4.02380750+02	2.58700220+02	1.70000260+02	4.91998200+01	2.55999390+01	5.25999460+00	2.68999940+00

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 500.00054 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	1.77899710+02	9.82701150+01	6.36997080+01	1.72000100+01	9.36004390+00	2.21000100+00	1.20999954+00
KAPPA(R)	1.77899710+02	9.82701150+01	6.36997080+01	1.72000100+01	9.36004390+00	2.21000100+00	1.20999954+00

THETA = 699.99976 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	4.78002070+01	1.81400090+01	1.01499621+01	2.71999490+00	1.58000023+00	5.41000000-01	3.98999940-01
KAPPA(R)	4.78002070+01	1.81400090+01	1.01499621+01	2.71999490+00	1.58000023+00	5.41000000-01	3.98999940-01

THETA = 799.99657 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	3.12300250+01	1.04699577+01	5.84999020+00	1.63999959+00	1.01099994+00	4.08000040-01	3.24000570-01
KAPPA(R)	3.12300250+01	1.04699577+01	5.84999020+00	1.63999959+00	1.01099994+00	4.08000040-01	3.24000570-01

THETA = 1000.00468 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	1.74200170+01	5.07400270+00	2.89999780+00	9.16000010-01	6.19000000-01	3.10000920-01	2.62000200-01
KAPPA(R)	1.74200170+01	5.07400270+00	2.89999780+00	9.16000010-01	6.19000000-01	3.10000920-01	2.62000200-01

THETA = 1499.99930 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	1.02799971+01	2.34999920+00	1.39000034+00	5.39000140-01	3.84999980-01	2.46999240-01	2.19000780-01
KAPPA(R)	1.02799971+01	2.34999920+00	1.39000034+00	5.39000140-01	3.84999980-01	2.46999240-01	2.19000780-01

THETA = 1999.99500 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	7.53003710+00	1.70599922+00	1.01999996+00	4.16000010-01	3.21001330-01	2.19999500-01	1.99999580-01
KAPPA(R)	7.53003710+00	1.70599922+00	1.01999996+00	4.16000010-01	3.21001330-01	2.19999500-01	1.99999580-01

THETA = 2500.00980 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	3.22999310+00	8.65499910-01	5.75999770-01	3.06999240-01	2.64998790-01	1.96000120-01	1.87700060-01
KAPPA(R)	3.22999310+00	8.65499910-01	5.75999770-01	3.06999240-01	2.64998790-01	1.96000120-01	1.87700060-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 3500.00000 7 DENSITIES

DENSITY	1.00000467+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	8.69000130-01	3.80000000-01	2.93998670-01	2.01000070-01	1.90000230-01	1.79999720-01	1.78499400-01
KAPPA(R)	8.69000130-01	3.80000000-01	2.93998670-01	2.01000070-01	1.90000230-01	1.79999720-01	1.78499400-01

THETA = 4999.98000 7 DENSITIES

DENSITY	1.00000467+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	2.99000510-01	2.03999040-01	1.91999980-01	1.74999880-01	1.73000630-01	1.73000630-01	1.72499660-01
KAPPA(R)	2.99000510-01	2.03999040-01	1.91999980-01	1.74999880-01	1.73000630-01	1.73000630-01	1.72499660-01

THETA = 7500.01270 7 DENSITIES

DENSITY	1.00000467+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	1.92999050-01	1.76999210-01	1.72000140-01	1.69999470-01	1.69999470-01	1.69800680-01	1.69800680-01
KAPPA(R)	1.92999050-01	1.76999210-01	1.72000140-01	1.69999470-01	1.69999470-01	1.69800680-01	1.69800680-01

THETA = 9999.99520 7 DENSITIES

DENSITY	1.00000487+01	1.99999961+00	1.00000000+00	1.99999580-01	9.99995100-02	2.00000600-02	1.00000020-02
KAPPA(P)	1.68000210-01	1.61000150-01	1.59000170-01	1.58000040-01	1.58000040-01	1.58400280-01	1.58400280-01
KAPPA(R)	1.68000210-01	1.61000150-01	1.59000170-01	1.58000040-01	1.58000040-01	1.58400280-01	1.58400280-01

16 DIANE/SCAT QGRANITE-1A TEMP(1-2250) 1 FREQ C1/KDP 2-16-67 MATERL = 1128 NX = 861

GREY ABSORPTION COEFFICIENTS 21 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	9.62634490-01	1.09456618-01	8.51119440-03	6.27154300-04	6.22404780-05	8.94997430-06	1.24496902-06	1.38146670-07
KAPPA(P)	1.21313217+04	1.18916995+04	1.08551172+04	8.08056380+03	3.73197170+03	9.82785600+02	2.48106720+02	7.03545850+01
KAPPA(R)	6.74262010+02	1.01114732+03	9.28097570+02	7.18716480+02	3.61072210+02	1.18715153+02	2.93934820+01	7.97682900+00
DENSITY	1.57126460-08	1.67631180-09	1.77262410-10	1.84597250-11	1.73309935-12			
KAPPA(P)	1.57975044+01	3.13602160+00	4.77266130-01	7.63845370-02	3.22825970-02			
KAPPA(R)	1.98699938+00	4.57933550-01	9.74900460-02	3.97113990-02	2.95705890-02			

THETA = 1.50000 13 DENSITIES

DENSITY	2.24553340-01	2.64007460-02	2.79690460-03	3.43011020-04	4.40026850-05	6.25962670-06	9.27549290-07	1.40558790-07
KAPPA(P)	4.14609620+04	3.26761220+04	2.28830090+04	1.31340304+04	5.65107450+03	2.01973560+03	4.32063240+02	7.33910490+01
KAPPA(R)	1.03782531+04	6.87695560+03	6.74603360+03	4.01358030+03	1.66628850+03	5.36235790+02	1.31956980+02	2.25210620+01
DENSITY	2.09108040-08	2.66849980-09	2.87859100-10	2.38020390-11	1.91068390-12			
KAPPA(P)	1.07270543+01	1.41187781+00	2.47540270-01	8.26621880-02	5.15666060-02			
KAPPA(R)	3.05153460+00	4.26540270-01	1.61236896-01	5.36058550-02	4.82477050-02			

THETA = 2.25000 13 DENSITIES

DENSITY	1.19328989-01	1.56336010-02	1.91901168-03	2.72109230-04	4.45089620-05	8.07191400-06	1.36835676-06	1.94104340-07
KAPPA(P)	7.84868340+04	5.56579330+04	3.57390770+04	1.73353130+04	5.41935940+03	1.20409430+03	2.60114250+02	6.52594550+01
KAPPA(R)	4.98129020+04	3.39658200+04	1.98210920+04	8.05740620+03	2.50519010+03	6.39042130+02	1.33717850+02	2.71748510+01
DENSITY	2.42936750-08	2.90219070-09	3.19057440-10	3.11368270-11	2.62775870-12			
KAPPA(P)	1.31304500+01	1.85169991+00	2.38080880-01	8.65296650-02	6.55180890-02			
KAPPA(R)	4.52275600+00	6.45069830-01	1.35494400-01	6.82575650-02	6.31718170-02			

THETA = 3.40000 13 DENSITIES

DENSITY	9.54239220-02	1.40501670-02	2.18979570-03	3.59647910-04	5.85604510-05	9.60026350-06	1.56972523-06	2.42001980-07
KAPPA(P)	8.99059940+04	5.55284040+04	3.11669370+04	1.67201000+04	6.21158200+03	1.53783660+03	3.00954160+02	5.55105980+01
KAPPA(R)	7.19128240+04	4.56167370+04	2.43517600+04	1.02607673+04	3.07608160+03	7.06155140+02	1.32117000+02	2.34435630+01
DENSITY	3.32217690-08	3.92519420-09	4.48191720-10	4.61608120-11	3.97757000-12			
KAPPA(P)	9.36271180+00	1.39442940+00	2.26983940-01	8.79726790-02	7.79614360-02			
KAPPA(R)	3.72923050+00	5.62256790-01	1.38414430-01	7.91501180-02	7.60670570-02			

THETA = 5.00000 13 DENSITIES

DENSITY	1.01375366-01	1.73274730-02	2.71256670-03	4.30893760-04	7.30887640-05	1.27144688-05	2.09530800-06	3.37348290-07
KAPPA(P)	8.51363950+04	5.18645090+04	3.32639630+04	1.71219740+04	4.96324460+03	1.09348700+03	1.99943730+02	3.40229390+01
KAPPA(R)	7.16931030+04	4.25910740+04	2.27236150+04	9.39292450+03	2.77921540+03	5.91094520+02	9.88224650+01	1.58879183+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	4.07563770-08	5.87876100-09	6.65461770-10	6.60109940-11	5.07808620-12			
KAPPA(P)	5.86517210+00	9.53633750-01	1.87670030-01	1.00559972-01	9.20099890-02			
KAPPA(R)	2.49504900+00	4.15216290-01	1.31013100-01	9.30345820-02	9.07177740-02			

THETA = 7.00000 13 DENSITIES

DENSITY	1.19963349-01	2.05367160-02	3.33289830-03	5.50464030-04	9.51732150-05	1.74367600-05	2.95107530-06	4.71441900-07
KAPPA(P)	7.95634410+04	5.02914260+04	3.16444260+04	1.37028878+04	3.15523720+03	6.56915210+02	1.30317520+02	2.37044250+01
KAPPA(R)	6.24360670+04	4.26140750+04	2.37007010+04	7.96733180+03	1.62284970+03	3.34760700+02	6.42389670+01	1.13500364+01
DENSITY	6.77575490-08	8.25266380-09	9.05078020-10	8.77991000-11	7.99527940-12			
KAPPA(P)	5.20169210+00	8.24149770-01	1.86918040-01	1.19071157-01	1.12191392-01			
KAPPA(R)	1.79346024+00	3.28538580-01	1.37434750-01	1.12995251-01	1.09899277-01			

THETA = 10.00000 13 DENSITIES

DENSITY	1.54562060-01	2.60062820-02	4.46014070-03	7.60231170-04	1.35302160-04	2.48530540-05	4.20410560-06	6.54967720-07
KAPPA(P)	6.90504150+04	4.22817140+04	2.51942220+04	9.56708570+03	2.26426610+03	4.83079370+02	9.67663130+01	1.05640510+01
KAPPA(R)	4.69345760+04	3.36790050+04	1.61156555+04	4.69926300+03	1.00553394+03	2.07925520+02	4.29953930+01	7.90473540+00
DENSITY	9.23020030-08	1.14901030-08	1.30259160-09	1.35079190-10	1.23154087-11			
KAPPA(P)	3.32916990+00	5.74660000-01	1.76205730-01	1.25566350-01	1.23798255-01			
KAPPA(R)	1.29962060+00	2.77208870-01	1.41529660-01	1.21067021-01	1.21619738-01			

THETA = 15.00000 13 DENSITIES

DENSITY	2.11093730-01	3.75476260-02	6.48447130-03	1.12181989-03	1.97471750-04	3.58008150-05	6.14654780-06	1.00142106-06
KAPPA(P)	5.27089210+04	3.46873350+04	1.93027710+04	6.59913550+03	1.58046900+03	3.25303290+02	5.85364710+01	9.76619560+00
KAPPA(R)	3.37403050+04	2.49049010+04	1.16065777+04	3.47128070+03	8.18479170+02	1.52479920+02	2.50091070+01	4.17719510+00
DENSITY	1.48891200-07	1.67140750-08	2.12653950-09	2.19021780-10	1.99067980-11			
KAPPA(P)	1.62354591+00	3.41451380-01	1.59149380-01	1.39024930-01	1.40382270-01			
KAPPA(R)	7.75671240-01	2.28297880-01	1.47756440-01	1.36467870-01	1.37846020-01			

THETA = 22.49999 13 DENSITIES

DENSITY	3.00306510-01	5.44090930-02	9.39981770-03	1.63198959-03	2.98681430-04	5.66244920-05	9.98087410-06	1.63179909-06
KAPPA(P)	4.01051470+04	2.79300910+04	1.32081571+04	4.52082120+03	9.26284100+02	1.55146830+02	2.03915620+01	5.09056500+00
KAPPA(R)	2.60320020+04	2.01060060+04	9.53058020+03	2.51594300+03	4.28587080+02	8.13889850+01	1.51070060+01	2.35040010+00
DENSITY	2.41610240-07	3.02140200-08	3.42135260-09	3.50377530-10	3.19039930-11			
KAPPA(P)	9.71446160-01	2.69764210-01	1.67281540-01	1.57435570-01	1.60648900-01			
KAPPA(R)	4.90281380-01	2.07156860-01	1.59425100-01	1.54226340-01	1.57690970-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 33.99998 13 DENSITIES

DENSITY	4.50452790-01	8.10723760-02	1.43859103-02	2.59811270-03	4.87843450-04	9.29718330-05	1.63446500-05	2.66416400-06
KAPPA(P)	2.73062240+04	1.66857590+04	6.76450850+03	1.03377310+03	4.01935640+02	8.74486690+01	1.06406910+01	4.05909040+00
KAPPA(R)	1.53891076+04	1.09634785+04	4.61684990+03	1.12126290+03	2.24120070+02	4.30719080+01	7.65791670+00	1.48101992+00
DENSITY	3.94455010-07	4.96776890-08	5.66454130-09	5.00086790-10	5.32965270-11			
KAPPA(P)	7.85343160-01	2.49788930-01	1.79488520-01	1.75578330-01	1.78506550-01			
KAPPA(R)	3.82055190-01	1.99054420-01	1.70614100-01	1.71730480-01	1.75257320-01			

THETA = 50.00000 13 DENSITIES

DENSITY	7.04599370-01	1.24912099-01	2.27003710-02	4.20319230-03	7.98993300-04	1.54188600-04	2.73730940-05	4.45537220-06
KAPPA(P)	1.39068517+04	6.93844450+03	3.08806180+03	9.99713730+02	2.20233410+02	4.50053540+01	9.10606760+00	2.02137520+00
KAPPA(R)	6.51366930+03	4.36269140+03	2.48530810+03	7.58733790+02	1.48863670+02	2.76309900+01	4.77197840+00	9.46932370-01
DENSITY	6.59964410-07	8.23382640-08	9.40532450-09	9.08878280-10	9.25104100-11			
KAPPA(P)	5.07045670-01	2.31975150-01	1.88652800-01	1.83037360-01	1.83317250-01			
KAPPA(R)	3.04477320-01	1.98494670-01	1.82269300-01	1.79486730-01	1.79971100-01			

THETA = 69.99998 13 DENSITIES

DENSITY	1.03738945+00	1.88303730-01	3.44780980-02	6.44989780-03	1.21687890-03	2.31351350-04	4.07400220-05	6.67901580-06
KAPPA(P)	9.13196250+03	4.46290380+03	1.89194360+03	5.48554690+02	1.25797055+02	2.89146090+01	6.44769680+00	1.42774716+00
KAPPA(R)	4.33511730+03	2.85079430+03	1.48840590+03	4.09719560+02	7.63265580+01	1.42644150+01	2.69735690+00	6.24863470-01
DENSITY	1.00979833-06	1.30152370-07	1.51937770-08	1.60349565-09	1.49771560-10			
KAPPA(P)	3.91241630-01	2.11257400-01	1.38196610-01	1.86441270-01	1.87521640-01			
KAPPA(R)	2.61939430-01	1.94505270-01	1.54058250-01	1.83226350-01	1.84137230-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.60687740+00	2.93965460-01	5.34092140-02	9.08883440-03	1.87360677-03	3.62427910-04	6.55712020-05	1.10360081-05
KAPPA(P)	6.40695070+03	3.36020710+03	1.18195590+03	3.03497680+02	7.05400480+01	1.64131690+01	3.39309420+00	7.62104730-01
KAPPA(R)	3.40256180+03	2.12082390+03	8.34112210+02	1.91247960+02	3.58685900+01	7.21443500+00	1.35051715+00	3.92306790-01
DENSITY	1.66223062-06	2.16782800-07	2.53043430-08	2.66284750-09	2.47233000-10			
KAPPA(P)	2.79534970-01	2.01215460-01	1.91204830-01	1.91502760-01	1.93948810-01			
KAPPA(R)	2.30322210-01	1.96081280-01	1.88172530-01	1.88094650-01	1.90420780-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.64584000+00	4.80097960-01	8.79104150-02	1.67023480-02	3.26232220-03	6.43147190-04	1.16006290-04	1.98802410-05
KAPPA(P)	4.73818260+03	2.09160900+03	6.02059320+02	1.41328220+02	3.24691030+01	7.02668460+00	1.55587297+00	4.51256390-01
KAPPA(R)	2.43669260+03	1.30131160+03	4.05551940+02	8.63408620+01	1.69461040+01	3.44639920+00	8.26245020-01	3.28004530-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	2.97480960-06	3.81864530-07	4.45172150-08	4.72045910-09	4.44171730-10
KAPPA(P)	2.40651360-01	2.03524270-01	1.98852680-01	1.99362320-01	1.98313130-01
KAPPA(R)	2.21442790-01	1.98162080-01	1.95200900-01	1.94769000-01	1.94707080-01

THETA = 220.99990 13 DENSITIES

DENSITY	4.37785270+00	8.10319950-01	1.52329850-01	2.95126590-02	5.78620900-03	1.13750892-03	2.06163730-04	3.47690470-05
KAPPA(P)	2.64429010+03	8.78007330+02	2.50737340+02	6.13940510+01	1.63327766+01	3.63706488+00	9.53924780-01	3.39086050-01
KAPPA(R)	1.29967080+03	5.00671370+02	1.97097380+02	4.66560660+01	8.99759200+00	1.92261451+00	5.38336960-01	2.68287330-01
DENSITY	3.33757080-06	6.93621100-07	8.15964720-08	8.66824190-09	8.14627710-10			
KAPPA(P)	2.20422060-01	2.01152890-01	1.98649160-01	1.98379180-01	1.98639230-01			
KAPPA(R)	2.10072410-01	1.97788500-01	1.95298910-01	1.94801340-01	1.95021200-01			

THETA = 340.00012 13 DENSITIES

DENSITY	7.54038290+00	1.42053093+00	2.71163040-01	5.26926140-02	1.03824752-02	2.06501460-03	3.79836900-04	6.43970350-05
KAPPA(P)	1.29293220+03	4.30807760+02	1.29284570+02	3.12160680+01	7.13683930+00	1.63789370+00	4.64890300-01	2.44157440-01
KAPPA(R)	6.55875490+02	3.12254320+02	9.67730910+01	2.04568130+01	4.09897100+00	9.82309890-01	3.59292660-01	2.33259660-01
DENSITY	9.86955910-06	1.27928408-06	1.50048099-07	1.59340110-08	1.49958120-09			
KAPPA(P)	2.06035040-01	2.00833110-01	2.00466320-01	2.00446880-01	2.00445870-01			
KAPPA(R)	2.03353180-01	1.97298390-01	1.96829380-01	1.96801430-01	1.96792380-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.27588269+01	2.42239490+00	4.68913060-01	9.23629820-02	1.83878710-02	3.66649550-03	6.71005680-04	1.13753476-04
KAPPA(P)	6.71293200+02	2.38731850+02	5.91345270+01	1.25441695+01	2.78108180+00	7.69264120-01	3.19457510-01	2.21958910-01
KAPPA(R)	2.97705240+02	1.49060450+02	4.08634460+01	8.55058750+00	1.85582137+00	5.50460650-01	2.72814550-01	2.12256890-01
DENSITY	1.74879230-05	2.27315930-06	2.67426800-07	2.84138250-08	2.67424170-09			
KAPPA(P)	2.03706910-01	2.00838730-01	2.00491990-01	2.00454700-01	2.00453290-01			
KAPPA(R)	1.99964080-01	1.97339650-01	1.96866390-01	1.96813830-01	1.96815600-01			

THETA = 699.99976 13 DENSITIES

DENSITY	2.02958010+01	3.92767240+00	7.68449750-01	1.52052560-01	3.02333700-02	6.03036970-03	1.10768391-03	1.88277060-04
KAPPA(P)	3.67461210+02	1.06063286+02	2.41185910+01	5.65745410+00	1.45261268+00	4.67111540-01	2.49732230-01	2.00297690-01
KAPPA(R)	1.32371010+02	5.82853590+01	1.54742595+01	3.45994940+00	8.72590150-01	3.50164230-01	2.33311920-01	2.04471840-01
DENSITY	2.89647780-05	3.76542460-06	4.42989800-07	4.70676550-08	4.42989480-09			
KAPPA(P)	2.01625250-01	2.00645820-01	2.00526670-01	2.00546320-01	2.00544920-01			
KAPPA(R)	1.98120040-01	1.97097250-01	1.96975090-01	1.97033200-01	1.97032020-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 999.99967 13 DENSITIES

DENSITY	3.39367020+01	6.62266590+00	1.30109822+00	2.57944460-01	5.14685160-02	1.02883513-02	1.89103120-03	3.21460530-04
KAPPA(P)	1.59417240+02	4.38387870+01	1.07510775+01	2.53460060+00	6.75604720-01	2.91645860-01	2.15530010-01	2.03145660-01
KAPPA(R)	5.33193650+01	2.36006430+01	6.23402370+00	1.49742577+00	4.83995870-01	2.60067930-01	2.00320010-01	1.99210510-01
DENSITY	4.94505070-05	6.42933200-06	7.56396610-07	8.03671830-08	7.56396830-09			
KAPPA(P)	2.01167960-01	2.00865850-01	2.00978170-01	2.00973940-01	2.00973540-01			
KAPPA(R)	1.97777020-01	1.97558010-01	1.97755660-01	1.97753090-01	1.97752700-01			

THETA = 1499.99930 13 DENSITIES

DENSITY	6.12110020+01	1.20319701+01	2.37859710+00	4.73178820-01	9.45214950-02	1.88995530-02	3.47399000-03	5.90573770-04
KAPPA(P)	6.91500010+01	1.75261833+01	4.08136290+00	9.70217900-01	3.45176980-01	2.20154790-01	2.06215200-01	2.02340570-01
KAPPA(R)	1.52312255+01	6.15022080+00	1.63496400+00	4.91180400-01	2.60898460-01	2.11247890-01	2.00801980-01	1.98845520-01
DENSITY	9.08573430-05	1.18114639-05	1.38957871-06	1.47642800-07	1.38957913-08			
KAPPA(P)	2.01691490-01	2.01629380-01	2.01545520-01	2.01544110-01	2.01543910-01			
KAPPA(R)	1.93515910-01	1.98491700-01	1.98420650-01	1.98420060-01	1.98419850-01			

THETA = 2249.99070 13 DENSITIES

DENSITY	1.11191010+02	2.19573510+01	4.35592930+00	8.69048540-01	1.73636710-01	3.47202550-02	6.38213250-03	1.08495259-03
KAPPA(P)	2.80608070+01	6.82451300+00	1.51051671+00	4.45820310-01	2.48260920-01	2.09759210-01	2.02464640-01	2.01177030-01
KAPPA(R)	2.97898000+00	1.03468593+00	3.91351320-01	2.48463820-01	2.11961210-01	2.00947420-01	1.98366090-01	1.97806430-01
DENSITY	1.60915060-04	2.16990970-05	2.55282500-06	2.71237800-07	2.55282540-08			
KAPPA(P)	2.00956260-01	2.00551740-01	2.00547520-01	2.00546930-01	2.00546930-01			
KAPPA(R)	1.97803330-01	1.97505070-01	1.97503490-01	1.97503490-01	1.97503290-01			

3 DIANE GROUT 1A/INT LMS/RP 7/27/66 MATERL = 1119 NX = 451

GREY ABSORPTION COEFFICIENTS 11 TEMPERATURES

THETA = 49.99985 13 DENSITIES

DENSITY	5.59728730-01	1.05251768-01	1.96044240-02	3.74651200-03	7.11460970-04	1.33381110-04	2.31074370-05	3.72404540-06
KAPPA(P)	1.16634790+04	5.00844050+03	1.92253520+03	5.65039190+02	1.52071370+02	4.17208070+01	1.01560664+01	2.45091200+00
KAPPA(R)	3.74579600+03	2.34073420+03	1.00106540+03	3.01638690+02	5.95543070+01	1.14564166+01	2.40986560+00	6.61633030-01
DENSITY	5.52330500-07	7.11055960-08	8.33752040-09	8.83703070-10	8.29569010-11			
KAPPA(P)	6.45210270-01	2.61447970-01	2.10190710-01	2.04544440-01	2.04417660-01			
KAPPA(R)	2.93696020-01	2.16607140-01	2.02497040-01	2.00767050-01	2.00773070-01			

THETA = 70.00033 13 DENSITIES

DENSITY	8.73518470-01	1.62947040-01	3.01349390-02	5.54150050-03	1.03312198-03	1.95408180-04	3.48973408-05	5.87055270-06
KAPPA(P)	9.04122530+03	4.25717020+03	1.56794320+03	4.74840970+02	1.25112079+02	3.13257340+01	6.55868410+00	1.30520055+00
KAPPA(R)	3.54318600+03	2.07247730+03	8.35927710+02	1.75856790+02	3.36075240+01	7.22473090+00	1.57506099+00	4.72023080-01
DENSITY	9.01054660-07	1.16789651-07	1.37091845-08	1.45465105-09	1.36854900-10			
KAPPA(P)	3.74001300-01	2.26722150-01	2.07480070-01	2.05378640-01	2.05214400-01			
KAPPA(R)	2.55166050-01	2.13535960-01	2.04593540-01	2.01878350-01	2.01501180-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.37804366+00	2.51991480-01	4.55174270-02	8.44399290-03	1.62647530-03	3.21134690-04	5.87276450-05	9.95435980-06
KAPPA(P)	8.64900840+03	4.21308260+03	1.27321430+03	3.04327050+02	6.57631690+01	1.39650808+01	2.77691330+00	6.41534060-01
KAPPA(R)	3.66578930+03	1.94218700+03	5.80372410+02	1.17974671+02	2.09657460+01	4.14076260+00	9.53308690-01	3.73599460-01
DENSITY	1.52268917-06	1.98356500-07	2.32212070-08	2.45239730-09	2.29458280-10			
KAPPA(P)	2.71500660-01	2.14477590-01	2.07725030-01	2.07874660-01	2.08964680-01			
KAPPA(R)	2.47496210-01	2.12105810-01	2.04295050-01	2.04123510-01	2.05158990-01			

THETA = 150.00069 13 DENSITIES

DENSITY	2.26027610+00	4.13829180-01	7.65462610-02	1.48340511-02	2.93522840-03	5.04280130-04	1.06927458-04	1.80692320-05
KAPPA(P)	5.64971450+03	2.04241850+03	5.24539080+02	1.14969855+02	2.45632140+01	5.07537280+00	1.14686138+00	3.83343430-01
KAPPA(R)	2.17118640+03	1.04856720+03	3.03894300+02	6.36233130+01	1.25080193+01	2.60692920+00	7.01936740-01	3.19004520-01
DENSITY	2.76325850-06	3.57940190-07	4.20797240-08	4.47034690-09	4.20742550-10			
KAPPA(P)	2.36503510-01	2.13380140-01	2.09852580-01	2.09395590-01	2.09347440-01			
KAPPA(R)	2.27762920-01	2.08764170-01	2.05993640-01	2.05610840-01	2.05536830-01			

THETA = 224.99990 13 DENSITIES

DENSITY	3.80741310+00	7.12234540-01	1.36762420-01	2.68580420-02	5.32102170-03	1.05697947-03	1.93523810-04	3.28585060-05
KAPPA(P)	2.53327940+03	6.73925790+02	1.82142620+02	4.18449020+01	9.29763410+00	2.23392240+00	6.07339700-01	2.77121280-01
KAPPA(R)	7.64850480+02	3.12404850+02	1.07917813+02	2.68584360+01	5.53216920+00	1.27351906+00	4.15624940-01	2.47332920-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99990 CONTINUED

DENSITY	5.05415450-06	6.57053760-07	7.72978370-08	8.21174930-09	7.72491750-10
KAPPA(P)	2.19733460-01	2.10678920-01	2.09500320-01	2.09374660-01	2.09473090-01
KAPPA(R)	2.14602020-01	2.07291340-01	2.05763050-01	2.05567670-01	2.05654030-01

THETA = 340.00148 13 DENSITIES

DENSITY	6.65233480+00	1.27644005+00	2.49561470-01	4.91597540-02	9.78132810-03	1.95354430-03	3.58977810-04	6.10130320-05
KAPPA(P)	9.45484540+02	2.91255240+02	7.60575250+01	1.73409370+01	3.76583640+00	9.12254480-01	3.38503790-01	2.31545240-01
KAPPA(R)	2.71407120+02	1.42229210+02	4.29170840+01	9.02708910+00	1.92855301+00	5.74101540-01	2.95150460-01	2.25640090-01
DENSITY	9.38122590-06	1.21787868-06	1.43074550-07	1.51889160-08	1.42927308-09			
KAPPA(P)	2.13056650-01	2.10337900-01	2.10184410-01	2.10281110-01	2.10300040-01			
KAPPA(R)	2.09100560-01	2.06439060-01	2.06335860-01	2.06447320-01	2.06467960-01			

THETA = 500.00094 13 DENSITIES

DENSITY	1.14201572+01	2.23876190+00	4.40447510-01	8.72855800-02	1.74174970-02	3.47931450-03	6.38665350-04	1.08425205-04
KAPPA(P)	4.75173470+02	1.33809870+02	3.29850430+01	6.73023450+00	1.55224360+00	5.02669690-01	2.71370560-01	2.21881900-01
KAPPA(R)	1.15523040+02	5.44367770+01	1.50530400+01	3.36817140+00	8.69276520-01	3.63713070-01	2.41412060-01	2.13747470-01
DENSITY	1.66683310-05	2.16671140-06	2.54898600-07	2.70819100-08	2.54891050-09			
KAPPA(P)	2.12264960-01	2.10520970-01	2.10321070-01	2.10302140-01	2.10300040-01			
KAPPA(R)	2.08078470-01	2.06734480-01	2.06480350-01	2.06455580-01	2.06453510-01			

THETA = 699.99976 13 DENSITIES

DENSITY	1.86569730+01	3.67892270+00	7.27161270-01	1.44301560-01	2.87789810-02	5.74704210-03	1.05576463-03	1.79452500-04
KAPPA(P)	1.67512630+02	4.51644360+01	1.02456167+01	2.47069130+00	7.41380710-01	3.32047780-01	2.33753060-01	2.13749610-01
KAPPA(R)	4.34669110+01	1.75162660+01	4.50676670+00	1.16444198+00	4.38372620-01	2.66972400-01	2.22070580-01	2.09506230-01
DENSITY	2.75081590-05	3.56877380-06	4.22236640-07	4.48608700-08	4.22224070-09			
KAPPA(P)	2.10663140-01	2.10283220-01	2.10232760-01	2.10226550-01	2.10226450-01			
KAPPA(R)	2.06655930-01	2.06296670-01	2.06257480-01	2.06253350-01	2.06253350-01			

THETA = 1000.00468 13 DENSITIES

DENSITY	3.15539670+01	6.25149100+00	1.23776456+00	2.45750120-01	4.90556460-02	9.80630230-03	1.80241113-03	3.06399750-04
KAPPA(P)	8.46597260+01	2.17103690+01	5.34809270+00	1.39063572+00	4.56713040-01	2.56265830-01	2.17551430-01	2.11043710-01
KAPPA(R)	2.08662270+01	8.74629310+00	2.33279230+00	7.12486010-01	3.34951340-01	2.35260940-01	2.10512590-01	2.06179110-01
DENSITY	4.71305430-05	6.12825830-06	7.20947180-07	7.65976200-08	7.20925820-09			
KAPPA(P)	2.09955430-01	2.09790020-01	2.09806410-01	2.09804320-01	2.09804320-01			
KAPPA(R)	2.05444370-01	2.05349880-01	2.05302740-01	2.05302740-01	2.05300690-01			

GRET ABSORPTION COEFFICIENTS CONTINUED

THETA = 1499.99930 13 DENSITIES

DENSITY	5.75825730+01	1.14324977+01	2.26105600+00	4.51061760-01	9.00986590-02	1.80144690-02	3.31118220-03	5.62093570-04
KAPPA(P)	3.80434890+01	9.71975090+00	2.42873450+00	6.55228010-01	2.90085380-01	2.23201570-01	2.11138250-01	2.08732870-01
KAPPA(R)	6.83741670+00	3.05759900+00	9.59283330-01	3.62554670-01	2.34546830-01	2.09378850-01	2.04542400-01	2.03418330-01
DENSITY	8.65983570-05	1.12583567-05	1.32446773-06	1.40719120-07	1.32742817-08			
KAPPA(P)	2.08334570-01	2.08274160-01	2.08267910-01	2.08265830-01	2.08265830-01			
KAPPA(R)	2.03225510-01	2.03198890-01	2.03196860-01	2.03196860-01	2.03196860-01			

THETA = 2250.01010 13 DENSITIES

DENSITY	1.05286997+02	2.07862140+01	4.14959180+00	8.29512790-01	1.65515570-01	3.30944480-02	6.08304430-03	1.03418395-03
KAPPA(P)	1.65437760+01	4.02626840+00	9.74518660-01	3.46955060-01	2.31925290-01	2.10683140-01	2.06335060-01	2.05540950-01
KAPPA(R)	1.62745426+00	6.52964840-01	3.22994490-01	2.30505620-01	2.07351470-01	2.01936900-01	2.00590450-01	2.00337860-01
DENSITY	1.59891670-04	2.36829690-05	2.43320820-06	2.58518150-07	2.43313570-08			
KAPPA(P)	2.05403280-01	2.05380690-01	2.05378640-01	2.05378640-01	2.05378640-01			
KAPPA(R)	2.00293790-01	2.00287790-01	2.00285780-01	2.00285780-01	2.00285780-01			

47 DIANE/SCAT H-21A TEMP(1.-34.) INPUT TAPE 1505 8-9-67 C1/BEF MATERL = 1001 NX = 533

GREY ABSORPTION COEFFICIENTS 13 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	4.20519210+00	4.62270570-01	3.30261040-02	1.83258089-03	8.80959540-05	3.98788350-06	1.65226270-07	9.06450200-09
KAPPA(P)	4.52810940+05	2.87164340+05	2.31262770+05	1.09749951+05	3.01382370+04	9.72236290+03	4.23479800+03	1.70085940+03
KAPPA(R)	6.21207980+02	6.07605590+02	6.06969760+02	6.00828160+02	5.74649880+02	5.10586950+02	3.74853750+02	1.62830830+02
DENSITY	8.74752510-10	1.02914772-10	1.19393695-11	1.26641632-12	1.19170640-13			
KAPPA(P)	3.91622350+02	5.20129110+01	6.52259290+00	1.05386140+00	4.63631880-01			
KAPPA(R)	3.36720780+01	4.78511000+00	1.00152730+00	4.82587220-01	4.05304430-01			

THETA = 1.25000 13 DENSITIES

DENSITY	5.02813670-01	4.96381790-02	3.34264470-03	1.82448620-04	9.38798400-06	5.83944460-07	5.42056900-08	7.44815220-09
KAPPA(P)	1.29206940+06	8.95257270+05	7.28097270+05	2.91335250+05	9.47929080+04	3.13092820+04	7.91305240+03	1.49201360+03
KAPPA(R)	4.75843380+03	4.49798550+03	4.46568070+03	4.32260230+03	3.75305670+03	2.27756910+03	6.65123670+02	1.09825633+02
DENSITY	1.09776461-09	1.41711200-10	1.65563440-11	1.76954282-12	1.66543490-13			
KAPPA(P)	2.18057330+02	2.32094610+01	3.42634460+00	7.23059470-01	4.32092280-01			
KAPPA(R)	1.49333109+01	2.30861940+00	7.00162240-01	4.42825940-01	4.04888880-01			

THETA = 1.50000 13 DENSITIES

DENSITY	1.31655450-01	1.20998120-02	7.97815670-04	4.68942270-05	3.30144630-06	3.75532810-07	5.74546540-08	9.30437470-09
KAPPA(P)	2.33994970+06	1.69176000+06	1.47254090+06	7.71807110+05	1.83643180+05	3.41268580+04	5.42085580+03	8.18587020+02
KAPPA(R)	2.13749070+04	1.93007440+04	1.85744260+04	1.59063531+04	9.21645640+03	2.64806620+03	4.34439180+02	5.86136120+01
DENSITY	1.43335241-09	1.86119910-10	2.18930930-11	2.32609560-12	2.18926590-13			
KAPPA(P)	1.22908225+02	1.61777200+01	2.25307550+00	5.83648300-01	4.17612880-01			
KAPPA(R)	8.00424470+00	1.48995926+00	5.96079160-01	4.39264250-01	4.08111070-01			

THETA = 1.75000 13 DENSITIES

DENSITY	5.38572100-02	4.73022280-03	3.25955730-04	2.35425790-05	2.51869440-06	4.02588890-07	6.99251910-08	1.17528527-08
KAPPA(P)	3.25522760+06	2.40009740+06	1.94832370+06	7.27456820+05	1.42392110+05	2.18534470+04	3.39436490+03	5.22610780+02
KAPPA(R)	6.91089750+04	5.91498550+04	5.19275210+04	3.38166970+04	1.13438946+04	2.09471320+03	2.89802300+02	3.75611010+01
DENSITY	1.80459434-09	2.34598360-10	2.75880080-11	2.93122720-12	2.75880140-13			
KAPPA(P)	7.68111510+01	1.02279889+01	1.46391388+00	5.09177860-01	4.07585680-01			
KAPPA(R)	5.37781400+00	1.18014308+00	5.65845330-01	4.46634540-01	4.02995530-01			

THETA = 2.00000 13 DENSITIES

DENSITY	2.92211070-02	2.54046280-03	1.94690790-04	1.83118900-05	2.59984170-06	4.71451340-07	8.47186700-08	1.43383234-08
KAPPA(P)	3.82576660+06	2.79354430+06	2.04981470+06	6.99436290+05	9.98196120+04	1.42644524+04	2.16209490+03	3.43941990+02
KAPPA(R)	1.75750370+05	1.39896760+05	1.05214869+05	4.83141570+04	1.08749133+04	1.67821990+03	2.18555060+02	2.85171820+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA =	2.00000	CONTINUED						
DENSITY	2.20418070-09	2.66506480-10	3.37061800-11	3.58128310-12	3.37081850-13			
KAPPA(P)	4.80952350+01	6.83306490+00	1.12229150+00	4.67414100-01	4.04476150-01			
KAPPA(R)	4.28340360+00	1.06283038+00	5.69209110-01	4.43025780-01	3.99167870-01			
THETA =	2.25000		13 DENSITIES					
DENSITY	1.92081610-02	1.70275628-03	1.50817070-04	1.77270300-05	2.91549790-06	5.54604830-07	1.00812859-07	1.71809850-08
KAPPA(P)	4.10341430+06	2.90510450+06	1.78364560+06	4.19540890+05	8.19584930+04	9.54434300+03	1.53360420+03	2.36960900+02
KAPPA(R)	3.49528340+05	2.63276440+05	1.63644200+05	5.56013200+04	1.01410818+04	1.45873360+03	1.86631290+02	2.40199300+01
DENSITY	2.62992040-09	3.41870230-10	4.02194720-11	4.27332070-12	4.02194800-13			
KAPPA(P)	3.80437310+01	4.99512270+00	9.24109650-01	4.43070710-01	4.03794820-01			
KAPPA(R)	3.80474750+00	1.05080200+00	5.84971760-01	4.29554650-01	3.98343730-01			
THETA =	3.40000		13 DENSITIES					
DENSITY	8.62846240-03	1.08172315-03	1.56280370-04	2.67780900-05	5.14014140-06	1.01855051-06	1.06061160-07	3.17545450-08
KAPPA(P)	3.12204160+06	1.41187610+06	5.11375740+05	1.03124260+05	1.45520181+04	2.41452280+03	4.11789378+02	8.50240810+01
KAPPA(R)	6.69709640+05	3.42494190+05	1.21212437+05	2.78319490+04	4.65443560+03	8.85989950+02	9.33602108+01	1.35011052+01
DENSITY	4.00498420-09	6.35042120-10	7.47105360-11	7.93799960-12	7.47105490-13			
KAPPA(P)	1.01440973+01	1.59563854+00	4.99836060-01	4.07087040-01	4.02577280-01			
KAPPA(R)	2.57604630+00	6.26132250-01	4.50005440-01	4.00647860-01	3.97641190-01			
THETA =	5.00000		13 DENSITIES					
DENSITY	9.00059070-03	1.45193959-03	2.51338900-04	4.64290610-05	9.10815910-06	1.81397515-08	3.33154340-07	5.66269970-08
KAPPA(P)	1.34416010+06	4.62175530+05	1.29633951+05	2.41471070+04	4.24559380+03	7.09706980+02	1.36226510+02	2.29048790+01
KAPPA(R)	1.86973070+05	7.20899460+04	2.10851010+04	5.10641530+03	1.07832800+03	2.14644670+02	3.85404360+01	8.40400000+00
DENSITY	8.71151010-09	1.13249801-09	1.33234550-10	1.41561807-11	1.33234576-12			
KAPPA(P)	3.71014680+00	7.40273240-01	4.25747690-01	4.02617740-01	4.00591690-01			
KAPPA(R)	1.25262191+00	5.04649530-01	4.05076460-01	3.96671700-01	3.95827250-01			
THETA =	7.00000		13 DENSITIES					
DENSITY	1.24311461-02	2.21496430-03	4.05437030-04	7.63611960-05	1.50643438-05	3.00389760-06	5.51838730-07	9.30018480-08
KAPPA(P)	5.66575790+05	1.72187620+05	4.35760990+04	8.67379720+03	1.63751960+03	3.09187210+02	5.53104410+01	9.57750820+00
KAPPA(R)	4.82079620+04	1.55632385+04	4.14688500+03	9.75597360+02	2.07877700+02	4.26250020+01	7.94519218+00	1.60043215+00
DENSITY	1.44306734-08	1.87598910-09	2.20703750-10	2.34497840-11	2.20703800-12			
KAPPA(P)	1.65447922+00	5.13765570-01	4.06716170-01	3.97214590-01	3.96259810-01			
KAPPA(R)	5.97828630-01	4.22759290-01	3.95772780-01	3.92647150-01	3.92316800-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 10.00000 13 DENSITIES

DENSITY	1.93791020-02	3.64600580-03	6.61445510-04	1.30025750-04	2.57046170-05	5.12833250-06	9.42217280-07	1.60162010-07
KAPPA(P)	2.41491380+05	6.39994570+04	1.59300236+04	3.29207760+03	6.29761380+02	1.23169195+02	2.25128890+01	3.93669670+00
KAPPA(R)	1.33650980+04	3.63040920+03	9.92149660+02	2.19279890+02	4.61948800+01	9.45733810+00	1.96166850+00	6.80377080-01
DENSITY	2.46398710-08	3.20314580-09	3.76943960-10	4.00396880-11	3.76844030-12			
KAPPA(P)	8.37021540-01	4.29758270-01	3.94084900-01	3.90041590-01	3.89669980-01			
KAPPA(R)	4.46392080-01	3.97899910-01	3.89807050-01	3.89602730-01	3.88499800-01			

THETA = 15.00000 13 DENSITIES

DENSITY	3.39140120-02	6.11246590-03	1.20820443-03	2.39488630-04	4.72049450-05	9.42061760-06	1.73095031-06	2.94237080-07
KAPPA(P)	4.50221520+04	1.26735951+04	2.90908520+03	6.28127990+02	1.30882230+02	2.66342770+01	5.02306830+00	1.07385204+00
KAPPA(R)	1.45800290+03	4.10422030+02	9.42079870+01	2.03423100+01	4.31517970+00	1.16250374+00	5.52051800-01	4.21055800-01
DENSITY	4.52664420-08	5.88464230-09	6.92308220-10	7.35577800-11	6.92308340-12			
KAPPA(P)	4.64499230-01	3.88525570-01	3.80326720-01	3.79453730-01	3.79359680-01			
KAPPA(R)	3.90365170-01	3.83538000-01	3.82310220-01	3.82201790-01	3.82189200-01			

THETA = 22.49999 13 DENSITIES

DENSITY	6.08430500-02	1.11385077-02	2.21335230-03	4.37759960-04	8.67044020-05	1.73059550-05	3.17993450-06	5.40543920-07
KAPPA(P)	2.31148350+04	6.09571270+03	1.35314380+03	2.87221290+02	5.93698750+01	1.20712307+01	2.37951470+00	6.66404720-01
KAPPA(R)	7.30660160+02	1.94795040+02	4.32411670+01	9.19405390+00	2.08986880+00	7.49941860-01	4.67942760-01	4.02153590-01
DENSITY	8.31599670-08	1.08106960-06	1.27185419-09	1.35134590-10	1.27185471-11			
KAPPA(P)	4.14955290-01	3.83362230-01	3.79940390-01	3.79541810-01	3.79498850-01			
KAPPA(R)	3.86350380-01	3.82901120-01	3.82320890-01	3.82270770-01	3.82265140-01			

THETA = 35.99998 13 DENSITIES

DENSITY	1.11618776-01	2.06011580-02	4.10509680-03	8.12807720-04	1.61041570-04	3.21464040-05	5.90689660-06	1.00409095-06
KAPPA(P)	1.11814223+04	2.80744180+03	6.07467050+02	1.27287071+02	2.61664210+01	5.37233150+00	1.19814351+00	4.93199710-01
KAPPA(R)	3.57170400+02	8.96785820+01	1.94056440+01	4.14766270+00	1.13931998+00	5.60382720-01	4.25632830-01	3.92262660-01
DENSITY	1.54474010-07	2.00816380-08	2.36256030-09	2.51019630-10	2.36256070-11			
KAPPA(P)	3.93980410-01	3.81223020-01	3.79699740-01	3.79525000-01	3.79506220-01			
KAPPA(R)	3.84208770-01	3.82528960-01	3.82303150-01	3.82280890-01	3.82278490-01			

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9        JIANE/SCAT  HMX/LO-HI/JP2 10 FREQ. TEMP.(1.-2250.) C1/JP  12-9-66 000003        MATERL = 1111    NX = 061

GREY ABSORPTION COEFFICIENTS          21   TEMPERATURES .

THETA =     1.00000                   13   DENSITIES

 DENSITY  1.49822321+01  1.64869306+00  1.18181464-01  6.64550230-03  3.37288470-04  1.84147240-05  1.11767490-06  8.30909500-08
KAPPA(P)  1.60533988+04  1.19026916+04  9.93809740+03  6.42978830+03  3.19027340+03  1.60721150+03  7.69941830+02  1.99012360+02
KAPPA(R)  2.14402040+02  2.06870430+02  2.04127950+02  1.90684070+02  1.57654820+02  1.04372259+02  4.83659950+01  1.50110171+01

 DENSITY  6.94268310-09  1.07571528-09  1.25120980-10  1.32180218-11  1.20118829-12
KAPPA(P)  3.47009470+01  4.48916620+00  5.39530750-01  9.19410210-02  4.57379000-02
KAPPA(R)  3.14336530+00  4.60950410-01  9.42874680-02  4.62377830-02  4.08961240-02

THETA =     1.50000                   13   DENSITIES

 DENSITY  7.53941420-01  7.02061580-02  4.90733620-03  3.31886690-04  2.85875310-05  3.71474710-06  5.94601400-07  9.77014150-08
KAPPA(P)  9.89391180+04  7.93449390+04  6.35754560+04  4.21693920+04  1.42772677+04  3.26906470+03  5.46463750+02  7.99955660+01
KAPPA(R)  4.70357440+03  4.22025520+03  3.67142420+03  2.49504610+03  1.00222718+03  2.60292220+02  4.90662200+01  8.94246220+00

 DENSITY  1.45492033-08  1.72686190-09  1.73072600-10  1.57624590-11  1.36111100-12
KAPPA(P)  1.23326101+01  2.10658330+00  4.28715830-01  1.14353014-01  7.08853140-02
KAPPA(R)  1.98012058+00  5.11967570-01  1.49922770-01  7.68780420-02  6.61893370-02

THETA =     2.25000                   13   DENSITIES

 DENSITY  1.34837900-01  1.31627820-02  1.30856919-03  1.72869260-04  2.96200250-05  5.48896980-06  8.90199700-07  1.26212360-07
KAPPA(P)  2.13284000+05  1.57873590+05  9.37099730+04  2.88345590+04  6.23921660+03  1.40924580+03  3.62042620+02  8.51676770+01
KAPPA(R)  4.26767080+04  3.21642180+04  1.70539810+04  5.64314040+03  1.43030350+03  4.00968120+02  1.12484061+02  2.52603750+01

 DENSITY  1.69428480-08  2.08875040-09  2.33331760-10  2.22465460-11  1.85215760-12
KAPPA(P)  1.50415742+01  2.07131620+00  3.39723920-01  1.16307586-01  9.25925110-02
KAPPA(R)  4.39972170+00  6.52969990-01  1.34398710-01  9.24754570-02  8.88386930-02

THETA =     3.40000                   13   DENSITIES

 DENSITY  7.31456220-02  9.75065330-03  1.45337335-03  2.37729760-04  3.89613700-05  6.66707080-06  1.12310881-06  1.73979220-07
KAPPA(P)  2.07063330+05  1.13076506+05  5.74545730+04  2.47868830+04  7.67433540+03  1.93791110+03  3.60037430+02  6.66995350+01
KAPPA(R)  1.41031760+05  7.97219260+04  3.26584850+04  1.05143460+04  2.45460710+03  4.57226000+02  9.22629750+01  2.32551240+01

 DENSITY  2.35544790-08  2.77412630-09  3.06075330-10  2.98994860-11  2.57745180-12
KAPPA(P)  1.26960127+01  2.01655820+00  3.54155570-01  1.40719880-01  1.20702794-01
KAPPA(R)  4.12767780+00  7.06829290-01  1.87578660-01  1.20272414-01  1.16901682-01

THETA =     5.00000                   13   DENSITIES

 DENSITY  7.30967040-02  1.17433401-02  1.82855004-03  2.97516770-04  5.14861930-05  8.97255640-06  1.46802004-06  2.27902050-07
KAPPA(P)  1.59224410+05  9.04253540+04  5.47432810+04  2.51715560+04  7.37772720+03  1.73025310+03  3.32243700+02  6.10400450+01
KAPPA(R)  1.41711760+05  8.21407790+04  3.26010560+04  8.53867290+03  2.16091270+03  4.80495350+02  1.04001779+02  2.00500610+01
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GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	3.17167620-08	3.81521060-09	4.22331790-10	4.14950050-11	3.77602290-12
KAPPA(P)	1.07547657+01	1.61010773+00	3.23289190-01	1.62273350-01	1.44595360-01
KAPPA(R)	3.40736060+00	5.79524330-01	2.02291610-01	1.44259820-01	1.41423550-01

THETA = 7.00000 13 DENSITIES

DENSITY	5.60253730-02	1.41184477-02	2.29682850-03	3.61106380-04	6.55809040-05	1.16511002-05	1.92730100-06	3.03404190-07
KAPPA(P)	1.39303450+05	6.45721160+04	5.13730990+04	2.56656190+04	7.21849610+03	1.41044130+03	2.55689790+02	4.46061660+01
KAPPA(R)	1.09173090+05	6.94734540+04	2.97168630+04	8.46832380+03	2.01422740+03	4.76892440+02	9.07572110+01	1.65328930+01
DENSITY	4.31528030-08	5.32592230-09	6.04215680-10	6.20531500-11	5.79335360-12			
KAPPA(P)	6.57975260+00	1.29233454+00	2.40559350-01	1.66922270-01	1.54567910-01			
KAPPA(R)	2.61795030+00	4.80564080-01	2.02507770-01	1.56690100-01	1.51934370-01			

THETA = 10.00000 13 DENSITIES

DENSITY	1.07881270-01	1.81434440-02	3.03273640-03	5.06973420-04	8.06442010-05	1.60881120-05	2.73019960-06	4.43374970-07
KAPPA(P)	1.11385349+05	7.36183710+04	4.63413480+04	1.84070100+04	4.33124320+03	8.94170920+02	1.60000360+02	2.63062740+01
KAPPA(R)	6.93443510+04	5.44604440+04	2.65042370+04	8.13874240+03	1.75382070+03	3.83372450+02	6.94020090+01	1.09900267+01
DENSITY	6.57149230-08	6.42266110-09	9.88581720-10	1.05006378-10	9.08265640-12			
KAPPA(P)	4.13320650+00	6.80036710-01	2.14623060-01	1.59706590-01	1.54020430-01			
KAPPA(R)	1.57415186+00	3.59077510-01	1.84418430-01	1.56255780-01	1.51526000-01			

THETA = 15.00000 13 DENSITIES

DENSITY	1.45782660-01	2.52117780-02	4.31109670-03	7.46376820-04	1.35501070-04	2.56271050-05	4.50261060-06	7.72997560-07
KAPPA(P)	6.35681580+04	5.58720750+04	3.10793820+04	9.69071950+03	2.01665590+03	3.76540160+02	5.94651030+01	8.99962560+00
KAPPA(R)	3.16257270+04	2.86924700+04	1.79107940+04	5.96026930+03	1.26543720+03	2.10740700+02	3.26175650+01	4.83064620+00
DENSITY	1.18782036-07	1.54321940-08	1.91505541-09	1.92443230-10	1.70794300-11			
KAPPA(P)	1.41518624+00	3.12400390-01	1.71793350-01	1.55731950-01	1.55909270-01			
KAPPA(R)	8.34739430-01	2.56309640-01	1.69266820-01	1.55654610-01	1.53216850-01			

THETA = 22.49999 13 DENSITIES

DENSITY	2.14801700-01	3.77296130-02	6.69973700-03	1.20933336-03	2.30923750-04	4.55431690-05	8.33956890-06	1.41271111-06
KAPPA(P)	3.34985550+04	3.30107940+04	1.36927932+04	3.21285700+03	5.01013490+02	1.00093044+02	1.68155990+01	2.86170910+00
KAPPA(R)	1.13737751+04	9.30420730+03	5.91963420+03	2.11379450+03	4.43797770+02	7.47153700+01	1.21540707+01	2.00011790+00
DENSITY	2.14881320-07	2.74958700-08	3.20030410-09	3.24574140-10	2.96182680-11			
KAPPA(P)	4.05595410-01	2.25401950-01	1.59951480-01	1.66264903-01	1.72936900-01			
KAPPA(R)	4.61544730-01	2.03818570-01	1.63761200-01	1.62771640-01	1.69709010-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 33.99998 13 DENSITIES

DENSITY	3.40413420-01	6.13854780-02	1.13487301-02	2.15225430-03	4.20329340-04	8.25822330-05	1.49180306-05	2.46812970-06
KAPPA(P)	2.70420720+04	1.33009953+04	4.26391050+03	8.64921700+02	1.71411310+02	3.50642050+01	7.50226510+00	1.01652709+00
KAPPA(R)	4.62309590+03	2.69183650+03	1.13043173+03	3.22844440+02	7.24924150+01	1.50453500+01	2.99925510+00	7.30167070-01
DENSITY	3.63142880-07	4.57394860-08	5.12031440-09	5.17609540-10	4.76118310-11			
KAPPA(P)	5.32158020-01	2.37057830-01	1.95713970-01	1.96563060-01	1.99808670-01			
KAPPA(R)	2.64427750-01	1.93469500-01	1.85490300-01	1.92149990-01	1.96105010-01			

THETA = 50.00030 13 DENSITIES

DENSITY	5.49654920-01	1.02945968-01	1.93163570-02	3.64057240-03	7.07024690-04	1.35027520-04	2.37214700-05	3.01545750-06
KAPPA(P)	1.35755056+04	5.37206630+03	1.52013370+03	4.19515940+02	1.15202304+02	3.36349250+01	8.08272140+00	2.29620400+00
KAPPA(R)	3.21317140+03	1.34968970+03	4.24630550+02	1.03356167+02	2.29432770+01	5.66946630+00	1.54570712+00	5.22601650-01
DENSITY	3.62769560-07	7.08614040-08	8.17643160-09	8.65451340-10	8.14175860-11			
KAPPA(P)	5.04168460-01	2.74507140-01	2.17410110-01	2.09206600-01	2.00302900-01			
KAPPA(R)	2.69022800-01	2.15842570-01	2.06857320-01	2.04994930-01	2.04535030-01			

THETA = 69.99998 13 DENSITIES

DENSITY	8.61177710-01	1.60757540-01	3.01155390-02	5.60176830-03	1.05066393-03	1.90499700-04	3.50361590-05	5.79833410-06
KAPPA(P)	9.43597070+03	3.93360500+03	1.25682500+03	3.80291080+02	1.12144009+02	3.04397080+01	7.08516380+00	1.52780164+00
KAPPA(R)	3.65165630+03	1.26850840+03	3.25975740+02	7.61270340+01	1.60556910+01	4.21701270+00	1.16567204+00	4.41674500-01
DENSITY	8.83545430-07	1.14665122-07	1.34867264-08	1.43292221-09	1.34863230-10			
KAPPA(P)	4.20109740-01	2.36091310-01	2.11419070-01	2.04500880-01	2.08225630-01			
KAPPA(R)	2.59428410-01	2.17734250-01	2.07763260-01	2.04961310-01	2.04430110-01			

THETA = 99.99990 13 DENSITIES

DENSITY	1.37575473+00	2.53172050-01	4.60020190-02	8.51411450-03	1.62124972-03	3.16346000-04	5.76880900-05	9.79010710-06
KAPPA(P)	8.38077720+03	3.70423930+03	1.14402830+03	3.01433970+02	7.25380270+01	1.57757109+01	3.06409410+00	6.91573670-01
KAPPA(R)	4.13264490+03	1.40164020+03	3.46507330+02	7.14370700+01	1.49006819+01	3.36491930+00	8.07265510-01	3.71276760-01
DENSITY	1.50571905-06	1.95733850-07	2.30274270-08	2.44666520-09	2.30274310-10			
KAPPA(P)	2.81280480-01	2.16700920-01	2.30942320-01	2.08203350-01	2.08137570-01			
KAPPA(R)	2.51233460-01	2.14598300-01	2.05285820-01	2.04299950-01	2.04211910-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.27562300+00	4.14499790-01	7.62090540-02	1.46297964-02	2.88821100-03	5.75819100-04	1.05776636-04	1.79796510-05
KAPPA(P)	6.03539100+03	2.25329970+03	6.05085020+02	1.28387240+02	2.57387590+01	5.18401570+00	1.10952906+00	3.50704220-01
KAPPA(R)	2.73298570+03	1.17082970+03	3.17020020+02	6.10147710+01	1.15562102+01	2.50127240+00	7.07654920-01	3.12496500-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	2.76505670-06	3.59353320-07	4.23041780-08	4.49477690-09	4.23041860-10
KAPPA(P)	2.24300420-01	2.09431460-01	2.07855740-01	2.07654010-01	2.07633070-01
KAPPA(R)	2.16518520-01	2.04401270-01	2.03477060-01	2.03308850-01	2.03291370-01

THETA = 224.99990 13 DENSITIES

DENSITY	3.91028120+00	7.06114980-01	1.34917470-01	2.65560690-02	5.24036000-03	1.05720043-03	1.94301780-04	3.30301430-05
KAPPA(P)	2.94098570+03	8.55449870+02	1.91646380+02	3.79363200+01	7.68077910+00	1.65189132+00	4.33697500-01	2.35809500-01
KAPPA(R)	7.26462410+02	3.07034750+02	8.72576270+01	1.86261590+01	3.82985520+00	8.05570680-01	3.18516810-01	2.18303410-01

DENSITY	3.06152400-06	6.60593260-07	7.77171480-08	8.25745040-09	7.77171600-10
KAPPA(P)	2.09663450-01	2.06455100-01	2.06085940-01	2.06038550-01	2.06033390-01
KAPPA(R)	2.05467230-01	2.01579380-01	2.01359580-01	2.01333200-01	2.01330390-01

THETA = 340.00012 13 DENSITIES

DENSITY	6.60559270+00	1.26953461+00	2.48415630-01	4.92157790-02	9.82265330-03	1.96363290-03	3.60922250-04	6.13554870-05
KAPPA(P)	1.02092230+03	2.73133340+02	6.00816180+01	1.23185464+01	2.57586570+00	6.31570750-01	2.65695060-01	2.11468760-01
KAPPA(R)	1.20358479+02	4.06840030+01	1.09334728+01	2.43752430+00	6.47794990-01	2.99606900-01	2.19150950-01	2.01910250-01

DENSITY	9.42928030-06	1.22710847-06	1.44365150-07	1.53398060-08	1.44365195-09
KAPPA(P)	2.04108000-01	2.03001280-01	2.02856790-01	2.02839550-01	2.02837720-01
KAPPA(R)	1.99083430-01	1.98637050-01	1.98578060-01	1.98570910-01	1.98570320-01

THETA = 499.99993 13 DENSITIES

DENSITY	1.14360536+01	2.23336350+00	4.41979390-01	8.77167850-02	1.75149930-02	3.50175510-03	6.43647110-04	1.09418230-04
KAPPA(P)	3.91825240+02	1.00073100+02	2.16960880+01	4.50275750+00	9.97101350-01	3.34215930-01	2.20190540-01	2.02381650-01
KAPPA(R)	4.64347640+01	7.97430880+00	1.39369091+00	5.54188710-01	2.82376490-01	2.18563210-01	2.01104900-01	1.96919160-01

DENSITY	1.60336540-05	2.18835660-06	2.57452670-07	2.73543610-08	2.57452750-09
KAPPA(P)	1.99732560-01	1.99322530-01	1.99263720-01	1.99262340-01	1.99261550-01
KAPPA(R)	1.96165030-01	1.96041290-01	1.96024810-01	1.96022850-01	1.96022660-01

THETA = 699.99976 13 DENSITIES

DENSITY	1.85806360+01	3.68673030+00	7.31249760-01	1.45269450-01	2.90121660-02	5.80060540-03	1.06620146-03	1.81251510-04
KAPPA(P)	1.51742530+02	3.48633790+01	7.47943300+00	1.60894823+00	4.43863720-01	2.37603010-01	2.02820880-01	1.97802470-01
KAPPA(R)	7.47149400+00	1.89667128+00	5.67432190-01	2.85042780-01	2.17848810-01	2.00189870-01	1.95378610-01	1.94220690-01

DENSITY	2.76847670-05	3.62502270-06	4.26471640-07	4.53126360-08	4.26471760-09
KAPPA(P)	1.96040690-01	1.95888430-01	1.95868250-01	1.95865910-01	1.95865710-01
KAPPA(R)	1.94023680-01	1.93989930-01	1.93985470-01	1.93984890-01	1.93984890-01

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA = 999.99967   13 DENSITIES

DENSITY	3.15622560+01	6.28214810+00	1.24676761+00	2.48009800-01	4.95359310-02	9.90429200-03	1.82050304-03	3.09481290-04
KAPPA(P)	3.37560040+01	1.11742718+01	2.46431900+00	6.17570700-01	2.65150910-01	1.93490670-01	1.80970500-01	1.88314270-01
KAPPA(R)	1.72314307+00	5.34948920-01	2.77966410-01	2.14835000-01	1.97807220-01	1.92515810-01	1.91299310-01	1.91014400-01
DENSITY	4.70123690-05	6.18960110-06	7.28185510-07	7.73497520-08	7.28192930-09			
KAPPA(P)	1.86227680-01	1.88214120-01	1.88212430-01	1.88212240-01	1.88212240-01			
KAPPA(R)	1.90983540-01	1.90978580-01	1.90978010-01	1.90977810-01	1.90977810-01			

THETA = 1499.99930   13 DENSITIES

DENSITY	5.77996660+01	1.15042899+01	2.28563320+00	4.55583890-01	9.10016190-02	1.81952630-02	3.34447600-03	5.68553010-04
KAPPA(P)	1.50760232+01	3.53180470+00	8.22453170-01	2.49871660-01	2.02296470-01	1.90239400-01	1.88534170-01	1.88257220-01
KAPPA(R)	8.95786800-01	3.58775650-01	2.35416020-01	2.03087780-01	1.94102090-01	1.91789320-01	1.91123010-01	1.90994290-01
DENSITY	8.74695410-05	1.13710494-05	1.33776544-06	1.42137630-07	1.33776567-08			
KAPPA(P)	1.88219200-01	1.88213180-01	1.88212930-01	1.88212830-01	1.88212830-01			
KAPPA(R)	1.90980080-01	1.90978580-01	1.90978200-01	1.90978200-01	1.90978200-01			

THETA = 2299.99670   13 DENSITIES

DENSITY	1.06000333+02	2.10390660+01	4.19817950+00	8.36919320-01	1.67178690-01	3.34267770-02	6.14419240-03	1.04449092-03
KAPPA(P)	7.30590150+00	1.65409023+00	4.44023100-01	2.26014000-01	1.93402950-01	1.89030420-01	1.88337260-01	1.88233140-01
KAPPA(R)	5.23640460-01	2.75746860-01	2.13910750-01	1.97142000-01	1.92498290-01	1.91319970-01	1.91026710-01	1.90985840-01
DENSITY	1.60691050-04	2.08900000-05	2.45763760-06	2.61129140-07	2.45763040-08			
KAPPA(P)	1.88216290-01	1.88213560-01	1.88213180-01	1.88213180-01	1.88213180-01			
KAPPA(R)	1.90979730-01	1.90978770-01	1.90978580-01	1.90978580-01	1.90978580-01			

14 DIANE/SCAT LIH/XTRAHI-10A 10 FREQ. TEMP(50.-22500.) CI/WL 1/1000000 MATERL = 1108 NX = 697

GREY ABSORPTION COEFFICIENTS 17 TEMPERATURES

THETA = 50.00000 13 DENSITIES

DENSITY	4.05679090-01	7.54340090-02	1.45355048-02	2.88002330-03	5.65109210-04	1.12070709-04	2.07436600-05	3.52623450-06
KAPPA(P)	1.79188490+04	3.37402340+03	1.10703820+03	2.19005690+02	4.17530630+01	8.36090200+00	1.62937742+00	4.01541210-01
KAPPA(R)	2.14475459+03	7.39362240+02	1.94022863+02	4.33621090+01	9.00972000+00	1.87460391+00	4.95144810-01	2.50943860-01
DENSITY	5.42493490-07	7.05241970-08	8.29693283-09	8.01549490-10	8.29693430-11			
KAPPA(P)	2.23600570-01	2.03994140-01	2.01845853-01	2.01612240-01	2.01587040-01			
KAPPA(R)	2.03445390-01	1.98767790-01	1.97974913-01	1.97892760-01	1.97884050-01			

THETA = 69.99998 13 DENSITIES

DENSITY	6.27932240-01	1.22397824-01	2.38373170-02	4.69786570-03	9.35952360-04	1.08972330-04	3.43610320-05	5.84122570-06
KAPPA(P)	7.83432470+03	2.13737550+03	4.34009310+02	8.78941270+01	1.73951600+01	3.53196360+00	7.41913660-01	2.89543630-01
KAPPA(R)	5.74567310+02	1.69242720+02	4.02964343+01	9.04335250+00	1.93024915+00	5.42918970-01	2.70470570-01	2.10849220-01
DENSITY	8.94643000-07	1.16822528-07	1.37439105-08	1.46025147-09	1.37439120-10			
KAPPA(P)	2.07290720-01	1.99516350-01	1.98654330-01	1.98539540-01	1.98527230-01			
KAPPA(R)	1.98188340-01	1.96079120-01	1.95782480-01	1.95745880-01	1.95741960-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.04491417+00	2.07128480-01	4.05754610-02	8.01597390-03	1.59787765-03	3.19239030-04	5.86710840-05	9.97369020-06
KAPPA(P)	3.23123570+03	7.99422030+02	1.72383383+02	3.51252750+01	7.06822220+00	1.47597780+00	3.91859790-01	2.21562400-01
KAPPA(R)	1.67072353+02	4.31756150+01	1.00940987+01	2.25498690+00	6.05953030-01	2.09471910-01	2.16699640-01	1.98766200-01
DENSITY	1.53440170-06	1.99472410-07	2.34672530-08	2.49339670-09	2.34672580-10			
KAPPA(P)	1.78973420-01	1.95397830-01	1.95504283-01	1.95457380-01	1.95452280-01			
KAPPA(R)	1.94692870-01	1.93974990-01	1.93877450-01	1.93865630-01	1.93864270-01			

THETA = 149.99995 13 DENSITIES

DENSITY	1.90309155+00	3.78639270-01	7.44726750-02	1.47208121-02	2.93524610-03	5.86470630-04	1.07705230-04	1.03220810-05
KAPPA(P)	5.12959410+02	1.17377580+02	2.56499840+01	5.43096040+00	1.16486766+00	3.45784970-01	2.67443060-01	1.90383650-01
KAPPA(R)	2.55635440+01	5.80595090+00	1.34232917+00	4.40096440-01	2.52578300-01	2.07340900-01	1.94929560-01	1.91762620-01
DENSITY	2.81888280-06	3.66451380-07	4.31122010-08	4.58067330-09	4.31122000-10			
KAPPA(P)	1.84405350-01	1.88154280-01	1.88126250-01	1.88123850-01	1.88122870-01			
KAPPA(R)	1.91082300-01	1.90971130-01	1.90960820-01	1.90959480-01	1.90959290-01			

THETA = 224.99990 13 DENSITIES

DENSITY	3.47402190+00	6.94036880-01	1.35575580-01	2.70304860-02	5.39214510-03	1.07740490-03	1.98813760-04	3.36610250-05
KAPPA(P)	2.43393450+02	5.38920490+01	1.17837205+01	2.45785850+00	5.85080690-01	2.47274800-01	1.95[illegible]1680-01	1.89027260-01
KAPPA(R)	1.20377311+01	2.69134100+00	7.14300660-01	3.11961020-01	2.22431070-01	1.99355420-01	1.[illegible]903153-01	1.91328960-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99990 CONTINUED

DENSITY	5.17857030-06	6.73215730-07	7.92023430-08	8.41525250-09	7.92023560-10
KAPPA(P)	1.83230370-01	1.88136790-01	1.88124370-01	1.88122860-01	1.88122670-01
KAPPA(R)	1.90998440-01	1.90964540-01	1.90959860-01	1.90959290-01	1.90959290-01

THETA = 340.00012 13 DENSITIES

DENSITY	6.43074590+00	1.25437776+00	2.51742080-01	5.02199950-02	1.00160044-02	2.00134060-03	3.67823650-04	6.25277590-05
KAPPA(P)	1.12990.55+02	2.50817620+01	5.23525340+00	1.12880131+00	3.40346100-01	2.09247680-01	1.90764230-01	1.88092510-01
KAPPA(R)	3.54317450+00	1.31593963+00	4.31765740-01	2.50861570-01	2.06959950-01	1.95090440-01	1.91864480-01	1.91123010-01
DENSITY	9.61956050-06	1.25054648-06	1.47122530-07	1.56317780-08	1.47122579-09			
KAPPA(P)	1.88170050-01	1.88123880-01	1.88123430-01	1.88122670-01	1.88122670-01			
KAPPA(R)	1.90976060-01	1.90961550-01	1.90959480-01	1.90959290-01	1.90959290-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.14472066+01	2.25440130+00	4.48849160-01	8.95539540-02	1.78617630-02	3.56907790-03	6.55957890-04	1.11508917-04
KAPPA(P)	5.36293770+01	1.18051512+01	2.46648180+00	5.87640910-01	2.49022200-01	1.96203280-01	1.89208820-01	1.88260530-01
KAPPA(R)	2.67857290+00	7.15230360-01	3.12349350-01	2.22583050-01	1.99422420-01	1.93003410-01	1.91385600-01	1.91013530-01
DENSITY	1.74551670-05	2.23015400-06	2.62372660-07	2.78771100-08	2.62372740-09			
KAPPA(P)	1.88144530-01	1.88125490-01	1.88123050-01	1.88122670-01	1.88122670-01			
KAPPA(R)	1.90967300-01	1.90960240-01	1.90959290-01	1.90959290-01	1.90959290-01			

THETA = 699.99976 13 DENSITIES

DENSITY	1.89442780+01	3.71485990+00	7.43431750-01	1.48340940-01	2.95878050-02	5.91217020-03	1.08659537-03	1.84714730-04
KAPPA(P)	2.80253540+01	6.11519090+00	1.30362871+00	3.71766280-01	2.14100870-01	1.91647900-01	1.88653930-01	1.88195300-01
KAPPA(R)	1.45312739+00	4.69337710-01	2.59325820-01	2.09177730-01	1.95766630-01	1.92082170-01	1.91192400-01	1.90905840-01
DENSITY	2.84173710-05	3.69426120-06	4.34621680-07	4.61785730-08	4.34621740-09			
KAPPA(P)	1.88133770-01	1.88124150-01	1.88122860-01	1.88122670-01	1.88122670 01			
KAPPA(R)	1.90963430-01	1.90959670-01	1.90959290-01	1.90959290-01	1.90959290-01			

THETA = 999.99967 13 DENSITIES

DENSITY	3.23267790+01	6.34166900+00	1.26924988+00	2.53280170-01	5.05199400-02	1.00940491-02	1.85532765-03	3.15394620-04
KAPPA(P)	1.40147079+01	3.04660230+00	6.97819780-01	2.66210480-01	1.98735790-01	1.89642900-01	1.88350910-01	1.88158230-01
KAPPA(R)	5.12723680-01	3.37731530-01	2.28743720-01	2.01061790-01	1.93528590-01	1.91521730-01	1.91059760-01	1.90972460-01
DENSITY	4.85219640-05	6.30782290-06	7.42101420-07	7.88483200-08	7.42101640-09			
KAPPA(P)	1.88128130-01	1.88123230-01	1.88122670-01	1.88122490-01	1.88122490-01			
KAPPA(R)	1.90961200-01	1.90959460-01	1.90959100-01	1.90959100-01	1.90959100-01			

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA = 1499.99930   13 DENSITIES

DENSITY	5.92902600+01	1.16436229+01	2.33162550+00	4.64925080-01	9.27772320-02	1.85454090-02	3.40845220-03	5.79417880-04
KAPPA(P)	4.30136500+00	1.40559175+00	3.89551690-01	2.16768790-01	1.92038770-01	1.80759420-01	1.88215440-01	1.88138400-01
KAPPA(R)	4.79370550-01	2.64169590-01	2.10367330-01	1.94067560-01	1.92191300-01	1.91234280-01	1.90993090-01	1.90965210-01
DENSITY	6.91405750-05	1.15882386-05	1.36333048-06	1.44853920-07	1.36333073-08			
KAPPA(P)	2.30125420-01	1.88122860-01	1.88122670-01	1.68122670-01	1.88122670-01			
KAPPA(R)	1.90960240-01	1.90959480-01	1.90959290-01	1.90959290-01	1.90959290-01			

THETA = 2249.99870   13 DENSITIES

DENSITY	1.06444553+02	2.13979040+01	4.28328390+00	9.54112040-01	1.70442210-01	3.40700690-02	8.26172860-03	1.08445648-03
KAPPA(P)	2.97037540+00	6.69148330-01	2.64501330-01	1.94486340-01	1.89614150-01	1.80378890-01	1.80163690-01	1.80129450-01
KAPPA(R)	3.34462600-01	2.28262040-01	2.00926520-01	1.93480600-01	1.91511390-01	1.91069090-01	1.90974570-01	1.90961960-01
DENSITY	1.63761380-04	2.12890020-05	2.50457900-06	2.65111630-07	2.50457940-08			
KAPPA(P)	1.80123610-01	1.88122670-01	1.88122490-01	1.88122490-01	1.88122490-01			
KAPPA(R)	1.90959670-01	1.90959290-01	1.90959290-01	1.90959290-01	1.90959290-01			

THETA = 3400.00050   13 DENSITIES

DENSITY	1.97977610+02	3.97957830+01	7.96633050+00	1.58855706+00	3.17005870-01	8.33671310-02	1.16462272-02	1.97979100-03
KAPPA(P)	1.35901965+00	3.62456360-01	2.15565600-01	1.91856030-01	1.88730350-01	1.88214500-01	1.88135090-01	1.88120220-01
KAPPA(R)	2.61940210-01	2.09873770-01	1.95937800-01	1.92143840-01	1.91224910-01	1.90994050-01	1.90965400-01	1.90959670-01
DENSITY	3.04581470-04	3.95957040-05	4.65829980-06	4.94944630-07	4.65830180-08			
KAPPA(P)	1.88117780-01	1.88117220-01	1.88117220-01	1.88117220-01	1.88117220-01			
KAPPA(R)	1.90958720-01	1.90958520-01	1.90958520-01	1.90958520-01	1.90958520-01			

THETA = 4999.99870   13 DENSITIES

DENSITY	3.53063510+02	7.09674240+01	1.41510239+01	2.82791580+00	5.65331940-01	1.13005702-01	2.07693070-02	3.53066170-03
KAPPA(P)	1.02913449+00	3.34766830-01	2.14101520-01	1.94099370-01	1.90651710-01	1.90000990-01	1.89874070-01	1.89851320-01
KAPPA(R)	2.28549450-01	2.01143840-01	1.93742750-01	1.91744600-01	1.91278840-01	1.91177570-01	1.91162770-01	1.91159710-01
DENSITY	5.45175560-04	7.00127440-05	8.30734920-06	8.82656330-07	8.30735070-08			
KAPPA(P)	1.89847540-01	1.89846580-01	1.89846580-01	1.89846580-01	1.89846580-01			
KAPPA(R)	1.91159530-01	1.91159140-01	1.91159140-01	1.91159140-01	1.91159140-01			

THETA = 6999.99890   13 DENSITIES

DENSITY	5.84850310+02	1.17555546+02	2.34410550+01	4.68443340+00	9.36472990-01	1.87194140-01	3.44043940-02	5.84854710-03
KAPPA(P)	5.96949590-01	2.58161740-01	2.01455450-01	1.91977320-01	1.90239210-01	1.89925190-01	1.89861390-01	1.89849630-01
KAPPA(R)	2.12723940-01	1.96893950-01	1.92597640-01	1.91480410-01	1.91205590-01	1.91189080-01	1.91161240-01	1.91159710-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 6999.99690 CONTINUED

DENSITY	8.99771250-04	1.16970127-04	1.37611670-05	1.46212461-06	1.37611690-07
KAPPA(P)	1.89847140-01	1.89847150-01	1.89846960-01	1.89846960-01	1.89846960-01
KAPPA(R)	1.91159520-01	1.91159520-01	1.91159520-01	1.91159520-01	1.91159520-01

THETA = 9999.99520 13 DENSITIES

DENSITY	9.96614650+02	2.00720010+02	4.00247080+01	7.99851570+00	1.59899833+00	3.19620460-01	5.07444060-02	9.98621150-03
KAPPA(P)	3.69924470-01	2.19290490-01	1.94077520-01	1.90684120-01	1.89896700-01	1.89752250-01	1.89723030-01	1.89717720-01
KAPPA(R)	2.03169430-01	1.94216260-01	1.91839150-01	1.91245560-01	1.91110700-01	1.91092440-01	1.91088620-01	1.91087050-01
DENSITY	1.53633427-03	1.99723050-04	2.34967150-05	2.49652700-06	2.34967190-07			
KAPPA(P)	1.89716760-01	1.89716560-01	1.89716580-01	1.89716580-01	1.89716500-01			
KAPPA(R)	1.91087660-01	1.91087660-01	1.91087660-01	1.91087660-01	1.91087660-01			

THETA = 14999.99140 13 DENSITIES

DENSITY	1.83457100+03	3.63742640+02	7.34565410+01	1.46942016+01	2.93754730+00	5.87194590-01	1.07920439-01	1.83450400-02
KAPPA(P)	2.63743560-01	2.02060720-01	1.92030510-01	1.90177200-01	1.89844110-01	1.89780330-01	1.89767610-01	1.89765340-01
KAPPA(R)	1.97279260-01	1.92652540-01	1.91464060-01	1.91155490-01	1.91115360-01	1.91107150-01	1.91105430-01	1.91105240-01
DENSITY	2.82242170-03	3.66914390-04	4.31663210-05	4.58642410-06	4.31663280-07			
KAPPA(P)	1.89764960-01	1.89764780-01	1.89764760-01	1.89764780-01	1.89764780-01			
KAPPA(R)	1.91105050-01	1.91105050-01	1.91105050-01	1.91105050-01	1.91105050-01			

THETA = 22499.98500 13 DENSITIES

DENSITY	3.37032030+03	6.77420330+02	1.34948050+02	2.69949270+01	5.39461540+00	1.07874529+00	1.98862570-01	3.37034870-02
KAPPA(P)	2.20309650-01	1.95100200-01	1.90845320-01	1.90026450-01	1.89079820-01	1.39040400-01	1.89843380-01	1.89842400-01
KAPPA(R)	1.94257440-01	1.91683200-01	1.91306000-01	1.91172140-01	1.91153790-01	1.91150340-01	1.91149770-01	1.91149700-01
DENSITY	5.10512130-03	6.74065020-04	7.93017010-05	8.42501630-06	7.93010000-07			
KAPPA(P)	1.89842210-01	1.89842210-01	1.89842210-01	1.89842210-01	1.89842210-01			
KAPPA(R)	1.91149580-01	1.91149580-01	1.91149580-01	1.91149580-01	1.91149800-01			

111 DIANE LIH/HI 50. EV - 2250. EV 11 FREQ. CRD/GAL 9/30/66 000000 MATERL = 210A NX = 515

GREY ABSORPTION COEFFICIENTS 13 TEMPERATURES

THETA = 50.00000 13 DENSITIES

DENSITY	[illegible].05479690-01	7.54340890-02	1.45355048-02	2.84002330-03	5.65189210-04	1.12878780-04	2.07436600-05	3.52623450-06
KAPPA(P)	1.79168090+04	5.37492340+03	1.10768930+03	2.19085910+02	4.17539050+01	8.36091600+00	1.62453609+00	3.64110100-01
KAPPA(R)	2.14475150+03	7.39361490+02	1.94022860+02	4.33621090+01	9.[illegible]910730+00	1.03601248+00	3.56190900-01	7.60620900-02
DENSITY	5.42493390-07	7.05241970-08	8.29693280-09	8.61549490-10	8.29693430-11			
KAPPA(P)	1.44162260-01	1.09295178-01	1.04710173-01	1.04163968-01	1.04105132-01			
KAPPA(R)	2.59363450-02	1.78567640-02	1.67961590-02	1.66706930-02	1.66569780-02			

THETA = 69.99998 13 DENSITIES

DENSITY	6.27932240-01	1.22597924-01	2.38373170-02	4.69786570-03	9.35952750-04	1.86972330-04	3.43616320-05	5.84122570-06
KAPPA(P)	7.83432470+03	2.13737760+03	4.34009720+02	8.78941270+01	1.73950900+01	3.52745970+00	7.04397050-01	1.76812050-01
KAPPA(R)	5.76567360+02	1.69242720+02	4.02964340+01	9.04254790+00	1.88514792+00	3.88924750-01	7.75744630-02	1.88447100-02
DENSITY	6.96643000-07	1.16822526-07	1.37439106-08	1.46029147-09	1.37439120-10			
KAPPA(P)	6.52773600-02	7.07581900-02	6.88407100-02	6.66121260-02	6.05874990-02			
KAPPA(R)	6.61316690-03	6.99062030-03	6.77650360-03	6.75096430-03	6.74023730-03			

THETA = 99.99998 13 DENSITIES

DENSITY	1.04891419+00	2.07128480-01	4.05954610-02	8.01597390-03	1.59787765-03	3.19239830-04	5.86710640-05	9.97369020-06
KAPPA(P)	3.23123570+03	7.99422810+02	1.72363550+02	3.51252750+01	7.06492210+00	1.44487915+00	3.01178540-01	8.60459070-02
KAPPA(R)	1.67072350+02	4.31956150+01	1.00935840+01	2.21934620+00	4.59505300-01	9.51636720-02	1.99717800-02	5.76848390-03
DENSITY	1.53440174-06	1.99472410-07	2.34672530-08	2.49339670-09	2.34672580-10			
KAPPA(P)	4.96805390-02	4.37871900-02	4.30092540-02	4.29165390-02	4.29065410-02			
KAPPA(R)	3.29959030-03	2.90855470-03	2.85697470-03	2.85082450-03	2.85016330-03			

THETA = 149.99995 13 DENSITIES

DENSITY	1.[illegible]39655+00	3.78639270-01	7.44726750-02	1.47208121-02	2.93524610-03	5.86470630-04	1.07785230-04	1.83228010-05
KAPPA(P)	[illegible]39530+02	1.17377588+02	2.56497030+01	5.42245130+00	1.11502320+00	2.33638320-01	5.21407230-02	1.80805770-02
KAPPA(R)	2.53[illegible]+01	5.80506020+00	1.26803212+00	2.68042150-01	5.50074320-02	1.14162331-02	2.43973220-03	7.55161460-04
DENSITY	2.81888260-06	3.65451380-07	4.31122010-08	4.58067330-09	4.31122080-10			
KAPPA(P)	1.21680329-02	1.12321509-02	1.11087189-02	1.10940095-02	1.10924232-02			
KAPPA(R)	4.62731310-04	4.16442990-04	4.10338150-04	4.09610850-04	4.09532220-04			

THETA = 224.99990 13 DENSITIES

DENSITY	3.47402190+00	6.94036800-01	1.35575580-01	2.70384860-02	5.39214510-03	1.07740490-03	1.98013760-04	3.36610250-05
KAPPA(P)	2.43393850+02	5.38920490+01	1.17816939+01	2.43343730+00	5.03314830-01	1.10144294-01	2.93471740-02	1.41909257-02
KAPPA(R)	1.20375422+01	2.66522900+00	5.82554690-01	1.20213253-01	2.47539060-02	5.30849980-03	1.31239043-03	5.63179030-04

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224,99990 CONTINUED

DENSITY	5.17857630-06	6.73215730-07	7.92023430-08	8.41525250-09	7.92023560-10
KAPPA(P)	1.15704437-02	1.11544245-02	1.10995694-02	1.10930335-02	1.10923233-02
KAPPA(R)	4.30174020-04	4.12599170-04	4.09985000-04	4.09562510-04	4.09527700-04

THETA = 340,00112 13 DENSITIES

DENSITY	6.43074600+00	1.26487776+00	2.51742850-01	5.02199960-02	1.00160044-02	2.00134060-03	3.67823690-04	6.25277990-05
KAPPA(P)	1.11990163+02	2.50814860+01	5.22627610+00	1.07763950+00	2.27171510-01	5.45163050-02	1.90901640-02	1.20529030-02
KAPPA(R)	5.53861840+00	1.24332902+00	2.54339930-01	5.31588260-02	1.10965172-02	2.55725220-03	8.05099260-04	4.76829900-04
DENSITY	9.64958150-06	1.25054648-06	1.47122530-07	1.56317780-08	1.47122579-09			
KAPPA(P)	1.13016478-02	1.11194771-02	1.10954510-02	1.10925897-02	1.10922902-02			
KAPPA(R)	4.19881320-04	4.10870700-04	4.09482530-04	4.09541230-04	4.09525670-04			

THETA = 499,99993 13 DENSITIES

DENSITY	1.14672366+01	2.25440180+00	4.48849160-01	8.95539540-02	1.70617630-02	3.56907790-03	6.55957090-04	1.11500917-04
KAPPA(P)	5.30307460+01	1.18034277+01	2.40221440+00	5.06110120-01	1.11172303-01	3.11061250-02	1.47917312-02	1.17217174-02
KAPPA(R)	2.65223310+00	5.63615150-01	1.20644508-01	2.44918960-02	5.35933710-03	1.40334023-03	5.92400550-04	4.40047210-04
DENSITY	1.71551370-05	2.23015400-06	2.62372660-07	2.79771100-08	2.62372740-09			
KAPPA(P)	1.11892311-02	1.11050426-02	1.10939320-02	1.10926117-02	1.10924679-02			
KAPPA(R)	4.14313350-04	4.10146980-04	4.09597350-04	4.09531800-04	4.09524040-04			

THETA = 699,99976 13 DENSITIES

DENSITY	1.89442760+01	3.71435990+00	7.43431750-01	1.48340940-01	2.95870050-02	5.91217820-03	1.08659537-03	1.84714730-04
KAPPA(P)	2.80278133+01	6.10572450+00	1.25833937+00	2.64284260-01	6.22091000-02	2.13495210-02	1.29007217-02	1.14100072-02
KAPPA(R)	1.30591364+00	3.01955380-01	6.20903310-02	1.29311914-02	2.93757450-03	9.16704630-04	5.02885020-04	4.25403260-04
DENSITY	2.84173710-05	3.69425120-06	4.34621680-07	4.61785730-08	4.34621740-09			
KAPPA(P)	1.11424482-02	1.10994358-02	1.10937766-02	1.10931003-02	1.10930223-02			
KAPPA(R)	4.11967350-04	4.09841950-04	4.09561700-04	4.09526110-04	4.09524430-04			

THETA = 999,99967 13 DENSITIES

DENSITY	3.23267790+01	6.34166400+00	1.26924988+00	2.53280170-01	5.05199480-02	1.00940491-02	1.85532785-03	3.15399420-04
KAPPA(P)	2.09346350+01	4.51985990+00	4.29965170-01	1.98350360-01	5.00870410-02	2.01401050-02	1.40190727-02	1.20729136-02
KAPPA(R)	6.92949350-01	1.49503320-01	3.07703330-02	6.59714400-03	1.64919330-03	6.50139270-04	4.50270840-04	4.17304480-04
DENSITY	4.05219140-05	6.30792290-06	7.42101420-07	7.88483900-08	7.42101640-09			
KAPPA(P)	1.26736402-02	1.26421728-02	1.26380269-02	1.26375342-02	1.26374837-02			
KAPPA(R)	4.10721390-04	4.09600160-04	4.09542060-04	4.09526400-04	4.09524040-04			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = [illegible]499.9[illegible]930 13 DENSITIES

DENSITY	5.9298[illegible]00+01	1.15466229+01	2.33162550+00	4.64925080-01	9.27772320-02	1.85454090-02	3.40845220-03	5.79417860-04
KAPPA(P)	6.4470[illegible]910+00	1.80978144+00	3.76276510-01	8.57273820-02	2.69599190-02	1.51070620-02	1.26842907-02	1.22308363-02
KAPPA(R)	3.1415[illegible]90-01	6.72751720-02	1.39544202-02	3.14694550-03	9.60892520-04	5.20007150-04	4.29849690-04	4.12980590-04
DENSITY	8.914[illegible]750-05	1.15382386-05	1.36333048-06	1.44853920-07	1.36333073-08			
KAPPA(P)	1.2152[illegible]23-02	1.21397753-02	1.21381372-02	1.21379424-02	1.21379186-02			
KAPPA(R)	4.1005[illegible]930-04	4.09593250-04	4.09532220-04	4.09525260-04	4.09524430-04			

THETA = [illegible]999.9[illegible]900 10 DENSITIES

DENSITY	4.5504[illegible]960+01	1.64185690+01	1.20255312+01	8.02566070+00	4.02129090+00	1.80304051+00	8.08820310-01	4.23921200-01
KAPPA(P)	2.7949[illegible]50+00	1.05226428+00	7.78869940-01	5.25619610-01	2.68494730-01	1.28843470-01	6.47720560-02	4.00954270-02
KAPPA(R)	9.2506[illegible]00-02	3.48222750-02	2.57726350-02	1.73898080-02	8.87874540-03	4.25610860-03	2.13527250-03	1.31843614-03
DENSITY	8.0735[illegible]760-02	8.56328870-03						
KAPPA(P)	1.7270[illegible]70-02	1.31921944-02						
KAPPA(R)	5.8275[illegible]20-04	4.27888490-04						

THETA = 2249.9[illegible]70 13 DENSITIES

DENSITY	1.0644[illegible]53+02	2.13979040+01	4.28328390+00	9.56112040-01	1.70442210-01	3.40700690-02	6.26172860-03	1.06445646-03
KAPPA(P)	4.2424[illegible]50+00	6.82399310-01	1.88024310-01	4.74427340-02	1.95512310-02	1.38507489-02	1.26860161-02	1.24621240-02
KAPPA(R)	1.4591[illegible]20-01	3.03136250-02	6.44566190-03	1.62707559-03	6.54547770-04	4.58589540-04	4.18549680-04	4.11059340-04
DENSITY	1.6376[illegible]60-04	2.12890020-05	2.50457900-06	2.66111630-07	2.50457940-08			
KAPPA(P)	1.2430[illegible]04-02	1.24243628-02	1.24235801-02	1.24234934-02	1.24234808-02			
KAPPA(R)	4.0976[illegible]610-04	4.09555160-04	4.09528110-04	4.09524840-04	4.09524430-04			

THETA = 2499.9[illegible]990 10 DENSITIES

DENSITY	6.3590[illegible]00+01	2.29447910+01	1.68056970+01	1.11911913+01	5.61983330+00	2.51985780+00	1.13035447+00	5.92445250-01
KAPPA(P)	1.6828[illegible]35+00	6.35456090-01	4.71408760-01	3.19819020-01	1.65441770-01	8.10378030-02	4.34941860-02	2.87379130-02
KAPPA(R)	5.9620[illegible]80-02	2.24955900-02	1.66811320-02	1.13082019-02	5.83662250-03	2.87327730-03	1.51423035-03	9.91174500-04
DENSITY	1.1283[illegible]08-01	1.19675560-02						
KAPPA(P)	1.5450[illegible]40-02	1.26592518-02						
KAPPA(R)	5.2018[illegible]60-04	4.21224360-04						

38 DIANE/SCAT LIMESTONE-18 5-25-67 TEMP(50-1,E4) AK/RW INPUT TAPE(3971) MATERL = 1131 NK = 815

GREY ABSORPTION COEFFICIENTS 13 TEMPERATURES

THETA = 50,00000 13 DENSITIES

DENSITY	6.64581[illegible]40-01	1.22949939-01	2.27085220-02	4.30135600-03	8.24563050-04	1.58656190-04	2.00295050-05	4.51001790-06
KAPPA(P)	1.4919[illegible]25+04	7.19195260+03	2.75613310+03	6.68022750+02	1.49249080+02	3.72036520+01	8.45773150+00	2.02342710+00
KAPPA(R)	5.8590[illegible]50+03	3.31411510+03	1.49986720+03	4.25901870+02	9.12233560+01	1.98629650+01	4.21066250+00	9.31710180-01
DENSITY	6.5974[illegible]60-07	8.11554190-08	9.15734160-09	9.50094320-10	8.80452800-11			
KAPPA(P)	5.3590[illegible]30-01	2.41396610-01	1.94245200-01	1.90656670-01	1.92642140-01			
KAPPA(R)	3.1529[illegible]30-01	2.02787630-01	1.86449650-01	1.86743170-01	1.89100190-01			

THETA = 69,99993 13 DENSITIES

DENSITY	1.0174[illegible]53+00	1.88077900-01	3.50156210-02	6.59491120-03	1.23734542-03	2.32303940-04	4.03410900-05	6.52591340-06
KAPPA(P)	1.2008[illegible]23+04	5.55776270+03	1.76756810+03	4.49050760+02	1.23124244+02	3.25162510+01	8.09541610+00	1.77420223+00
KAPPA(R)	5.9656[illegible]90+03	2.66292910+03	9.06334050+02	2.24299660+02	5.72939450+01	1.36475004+01	2.96978920+00	6.94210400-01
DENSITY	9.73361790-07	1.24230150-07	1.45057618-08	1.53783562-09	1.44228850-10			
KAPPA(P)	4.7177[illegible]50-01	2.30678430-01	1.98318090-01	1.94508780-01	1.94737460-01			
KAPPA(R)	2.82521[illegible]10-01	2.05268580-01	1.93030700-01	1.91098930-01	1.91243070-01			

THETA = 99,99999 13 DENSITIES

DENSITY	1.5901[illegible]12+00	2.94108650-01	5.38531710-02	9.90203510-03	1.84759780-03	3.52171950-04	6.29463420-05	1.05563020-05
KAPPA(P)	9.6212[illegible]60+03	4.40494010+03	1.35727050+03	3.23771160+02	8.99307510+01	2.23121640+01	4.58916950+00	9.29510100-01
KAPPA(R)	5.1654[illegible]80+03	2.19377910+03	6.55962350+02	1.45922590+02	3.58370030+01	7.90012320+00	1.60631364+00	4.36330610-01
DENSITY	1.61470[illegible]25-06	2.09004610-07	2.44939450-08	2.59637450-09	2.44261960-10			
KAPPA(P)	3.0741[illegible]60-01	2.10571290-01	1.97566110-01	1.96396440-01	1.96304940-01			
KAPPA(R)	2.41301[illegible]60-01	2.04400490-01	1.94427060-01	1.92972030-01	1.92745810-01			

THETA = 149,99995 13 DENSITIES

DENSITY	2.6104[illegible]00+00	4.74696650-01	8.69216640-02	1.62679240-02	3.14074580-03	6.10568803-04	1.12899903-04	1.91130100-05
KAPPA(P)	6.4160[illegible]80+03	2.27787430+03	6.71912390+02	1.96596020+02	4.32336000+01	8.55991240+00	1.73420046+00	4.57270290-01
KAPPA(R)	3.2153[illegible]750+03	1.22973[illegible]+03	3.67778530+02	9.74726620+01	1.79775100+01	3.56580390+00	8.45109050-01	3.45311900-01
DENSITY	2.93521460-06	3.61433270-07	4.40720900-08	4.76761390-09	4.40716490-10			
KAPPA(P)	2.36261630-01	2.01446100-01	1.96897690-01	1.96357950-01	1.96392970-01			
KAPPA(R)	2.2964[illegible]10-01	1.99007070-01	1.93637970-01	1.92820610-01	1.92731540-01			

THETA = 2[illegible] 13 DENSITIES

DENSITY	4.2[illegible]20+00	7.67080040-01	1.48205120-01	2.66506550-02	5.64470850-03	1.12311863-03	8.06189790-04	3.80360060-08
KAPPA(P)	3.23704570+03	1.00296604+03	2.82283510+02	6.57902730+01	1.34522004+01	2.83722000+00	6.72611620-01	8.76031300-01
KAPPA(R)	1.2110[illegible]50+03	5.78472470+02	1.93837640+02	4.43086140+01	8.66187300+00	1.88645307+00	5.43325390-01	8.06604090-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99990 CONTINUED

DENSITY	5.36970470-06	7.00402960-07	8.21977340-08	8.65161510-09	8.04830130-10			
KAPPA(P)	2.0838[illegible]19-01	1.97965390-01	1.97102770-01	1.98762030-01	2.01060790-01			
KAPPA(R)	2.0598[illegible]750-01	1.94619090-01	1.93519500-01	1.95129960-01	1.97393120-01			

THETA = 340.00012 13 DENSITIES

DENSITY	7.3538[illegible]30+00	1.38152433+00	2.67340810-01	5.25375040-02	1.04338707-02	2.08226090-03	3.81791850-04	6.44419360-05
KAPPA(P)	1.35145490+03	4.12234330+02	1.04152582+02	2.10854230+01	4.46653080+00	1.06258927+00	3.68620950-01	2.35202360-01
KAPPA(R)	5.33603450+02	1.60235870+02	5.55214250+01	1.33796510+01	3.00144840+00	7.82527590-01	3.11887110-01	2.17020160-01
DENSITY	9.80753[illegible]30-06	1.26435315-06	1.48409550-07	1.57636370-08	1.48357668-09			
KAPPA(P)	2.09470[illegible]60-01	2.03790050-01	2.02730530-01	2.02618990-01	2.02606420-01			
KAPPA(R)	2.00608400-01	1.99026550-01	1.98971630-01	1.98941590-01	1.98914140-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.25107[illegible]36+01	2.39769500+00	4.70779570-01	9.31353950-02	1.84256230-02	3.64440930-03	6.64184240-04	1.12538060-04
KAPPA(P)	5.25715[illegible]70+02	1.58519030+02	3.56991530+01	8.51604450+00	2.48847050+00	8.73902470-01	3.61988080-01	2.32099060-01
KAPPA(R)	1.16795[illegible]95+02	4.88152100+01	1.31677803+01	3.12033380+00	9.79195580-01	3.77222450-01	2.41295000-01	2.09035120-01
DENSITY	1.73014[illegible]60-05	2.24692110-06	2.64575300-07	2.81108550-08	2.64572690-09			
KAPPA(P)	2.07047920-01	2.03051020-01	2.02647750-01	2.02617350-01	2.02614720-01			
KAPPA(R)	2.02161170-01	1.99551280-01	1.98978000-01	1.98940400-01	1.98937610-01			

THETA = 699.99976 13 DENSITIES

DENSITY	2.01010680+01	3.02813930+00	7.70052630-01	1.51552370-01	2.99634190-02	5.96810400-03	1.09594093-03	1.86271550-04
KAPPA(P)	2.9450[illegible]20+02	8.40237890+01	2.33962310+01	6.82716820+00	1.84104415+00	5.51094650-01	2.66810930-01	2.11993000-01
KAPPA(R)	6.09614390+01	2.66055300+01	6.55742500+00	1.55552309+00	5.33135800-01	2.98178490-01	2.32450020-01	2.07818330-01
DENSITY	4.8056[illegible]00-05	3.72527490-06	4.38265910-07	4.65657850-08	4.38265990-09			
KAPPA(P)	2.0364[illegible]80-01	2.02789840-01	2.02697060-01	2.02687270-01	2.02686260-01			
KAPPA(R)	2.00017560-01	1.99173690-01	1.99096230-01	1.99089070-01	1.99088260-01			

THETA = 999.99967 13 DENSITIES

DENSITY	3.35573090+01	6.59316710+00	1.29282699+00	2.55757900-01	5.09463580-02	1.01797279-02	1.87090314-03	3.18001730-04
KAPPA(P)	1.51464750+02	4.79719310+01	1.33943054+01	3.19120620+00	6.20392160-01	3.17026470-01	2.17427020-01	2.04652260-01
KAPPA(R)	5.47960960+01	1.77958260+01	4.23239060+00	1.04856766+00	4.27136180-01	2.63802910-01	2.09475180-01	2.00427030-01
DENSITY	4.89291040-05	6.36077750-06	7.48323920-07	7.95094510-08	7.48324050-09			
KAPPA(P)	2.03078420-01	2.02856380-01	2.02827180-01	2.02823730-01	2.02823330-01			
KAPPA(R)	1.99442960-01	1.99319340-01	1.99303190-01	1.99301210-01	1.99301000-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1499.99930 13 DENSITIES

DENSITY	6.0619450+01	1.19131390+01	2.35664100+00	4.68015390-01	9.35468420-02	1.86993590-02	3.43700180-03	5.00277000-04
KAPPA(P)	7.56377090+01	2.08575490+01	4.74704010+00	1.11234609+00	3.61721030-01	2.27112230-01	2.06573000-01	2.03498750-01
KAPPA(R)	2.13130760+01	7.89357740+00	1.93661962+00	5.34490030-01	2.64444730-01	2.10175370-01	2.00913260-01	1.99525340-01
DENSITY	6.9680330-05	1.16355211-05	1.37476198-06	1.46068520-07	1.37476238-08			
KAPPA(P)	2.02941610-01	2.02860240-01	2.02049280-01	2.02048070-01	2.02047870-01			
KAPPA(R)	1.99291630-01	1.99258750-01	1.99253980-01	1.99253370-01	1.99253370-01			

THETA = 2249.94670 13 DENSITIES

DENSITY	1.10010625+02	2.17633630+01	4.31334900+00	8.60152310-01	1.71840940-01	3.43522760-02	6.31415180-03	1.87330817-03
KAPPA(P)	3.24953490+01	7.74577450+00	1.73185223+00	4.64839300-01	2.43887310-01	2.08310600-01	2.02121760-01	2.01280060-01
KAPPA(R)	4.20304530+00	1.33031705+00	4.63638090-01	2.57093640-01	2.03729430-01	1.99052440-01	1.97906810-01	1.97703660-01
DENSITY	1.65133060-04	2.14677250-05	2.52560480-06	2.68345650-07	2.52560530-08			
KAPPA(P)	2.01081740-01	2.01059580-01	2.01055560-01	2.01055150-01	2.01055150-01			
KAPPA(R)	1.97641600-01	1.97531720-01	1.97630520-01	1.97630330-01	1.97630330-01			

THETA = 3400.00050 13 DENSITIES

DENSITY	2.03267020+02	4.01716260+01	8.00934380+00	1.59757681+00	3.19196300-01	6.38112360-02	1.17289516-02	1.99308760-03
KAPPA(P)	1.26905000+01	2.92994600+00	7.00741860-01	2.81147170-01	2.11553150-01	1.99776510-01	1.98212810-01	1.97771090-01
KAPPA(R)	9.60145040-01	3.99940300-01	2.49763200-01	2.09157020-01	1.98273470-01	1.95666810-01	1.95427850-01	1.95385350-01
DENSITY	3.06750780-04	3.95774340-05	4.69149190-06	4.98471230-07	4.69149280-08			
KAPPA(P)	1.97694370-01	1.97692310-01	1.97680730-01	1.97680530-01	1.97680530-01			
KAPPA(R)	1.95283070-01	1.95280360-01	1.95279970-01	1.95279780-01	1.95279700-01			

THETA = 4999.99670 13 DENSITIES

DENSITY	3.61640970+02	7.15702820+01	1.42781728+01	2.84087720+00	5.69231420-01	1.13797469-01	2.09168130-02	3.55579730-03
KAPPA(P)	5.26399370+00	1.19379319+00	3.73228770-01	2.25332990-01	1.99675250-01	1.95020030-01	1.94090048-01	1.93917970-01
KAPPA(R)	4.24020450-01	2.53306260-01	2.10462240-01	1.97807420-01	1.94276670-01	1.93369570-01	1.93148680-01	1.93185620-01
DENSITY	5.47044430-04	7.11157330-05	8.36654110-06	8.08945480-07	8.36654360-09			
KAPPA(P)	1.93888410-01	1.93883270-01	1.93882690-01	1.93882690-01	1.93882690-01			
KAPPA(R)	1.93098480-01	1.93096930-01	1.93096730-01	1.93096730-01	1.93096730-01			

THETA = 6999.99690 13 DENSITIES

DENSITY	5.96749420+02	1.18293990+02	2.36180660+01	4.71840110+00	9.42926820-01	1.88505520-01	3.46487370-02	5.89019040-03
KAPPA(P)	1.33689410+00	3.93998960-01	2.19236110-01	1.92918390-01	1.89203520-01	1.88191540-01	1.88103490-01	1.88006930-01
KAPPA(R)	2.60961480-01	2.10747820-01	1.96412940-01	1.92424190-01	1.91408190-01	1.90990610-01	1.90958520-01	1.90952230-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 6999.99090 CONTINUED

DENSITY	9.06179050-04	1.17803344-04	1.38592180-05	1.47254262-06	1.38592210-07
KAPPA(P)	1.86084410-01	1.960837403-01	1.88083540-01	1.88083540-01	1.88083540-01
KAPPA(R)	1.90951090-01	1.90951080-01	1.90950890-01	1.90950890-01	1.90950890-01

THETA = 9999.99520 13 DENSITIES

DENSITY	1.01465401+03	2.01857290+02	4.03245290+01	8.05577290+00	1.61001145+00	3.21867280-01	5.91616350-02	1.00573153-02
KAPPA(P)	7.34512020-01	2.77115460-01	2.00551340-01	1.89878660-01	1.88386600-01	1.88136220-01	1.88093330-01	1.88085280-01
KAPPA(R)	2.30694490-01	2.02041730-01	1.93850700-01	1.91612150-01	1.91083070-01	1.90970940-01	1.90954710-01	1.90951650-01
DENSITY	1.54727500-03	2.01145720-04	2.36641350-05	2.51431540-06	2.36641390-07			
KAPPA(P)	1.88083920-01	1.88083540-01	1.88083540-01	1.88083540-01	1.88083540-01			
KAPPA(R)	1.90951080-01	1.90950890-01	1.90950890-01	1.90950890-01	1.90950890-01			

53 DIANE/SCAT NE-1A TEMP(1.5-1.E4) 11-6-67 SADY INPUT TAPES(3956.3963) MATERL = 1016 NX = 900

GREY ABSORPTION COEFFICIENTS 24 TEMPERATURES

THETA = 1.50000 13 DENSITIES

DENSITY	4.39494870+01	3.99579970+00	2.55628520-01	1.33693437-02	6.37276490-04	3.20312050-05	2.00830440-06	2.13109440-07
KAPPA(P)	2.38812730+04	1.79368920+04	1.25450679+04	4.16519320+03	1.37095790+03	5.70430850+02	2.10790230+02	5.30003730+01
KAPPA(R)	3.34213050+02	3.22006510-01	3.20096560+01	3.14972106+01	2.96102610+01	2.43712210+01	1.20902020+01	3.28822860+00
DENSITY	2.93011440-08	3.73630020-09	4.37821490-10	4.50930590-11	3.64967670-12			
KAPPA(P)	8.49268700+00	1.10754670+00	1.48010360-01	3.46595760-02	2.47731226-02			
KAPPA(R)	5.43701470-01	9.58615820-02	3.16570000-02	2.19059370-02	2.28367000-02			

THETA = 2.25000 13 DENSITIES

DENSITY	1.00690042+00	8.31536600-02	5.81420630-03	4.92271110-04	6.44786130-05	1.13463303-05	2.01409610-06	3.30311920-07
KAPPA(P)	2.04763300+05	1.61273990+05	1.13939169+05	3.15948670+04	4.69096520+03	7.26766620+02	1.17599190+02	2.14669160+01
KAPPA(R)	1.03327600+03	1.04035560+03	8.65125620+02	4.95565790+02	1.60750730+02	3.64332910+01	7.50949930+00	2.11936200+00
DENSITY	4.36829570-08	4.13096490-09	4.14636110-10	4.26720900-11	3.97640560-12			
KAPPA(P)	4.71256020+00	1.18374055+00	2.11616410-01	5.91736470-02	4.25470830-02			
KAPPA(R)	7.25354550-01	2.33438170-01	7.57035670-02	4.41932160-02	4.04317050-02			

THETA = 3.40000 13 DENSITIES

DENSITY	1.66926940-01	2.06573930-02	2.94602340-03	5.11604850-04	9.09231440-05	1.45056037-05	2.09950260-06	3.23822620-07
KAPPA(P)	3.75382470+05	1.99490110+05	8.00182060+04	1.60265367+04	3.24655910+03	8.43301040+02	1.92616670+02	3.39509130+01
KAPPA(R)	1.30256040+04	7.60027900+03	3.45745440+03	1.23830890+03	4.27223350+02	1.51531260+02	3.72707700+01	8.89900040+00
DENSITY	4.70220360-08	5.45032930-09	5.32371310-10	5.39290540-11	4.90046510-12			
KAPPA(P)	5.32407490+00	9.00773420-01	1.95926830-01	7.62996000-02	6.29270610-02			
KAPPA(R)	1.05309634+00	2.37253320-01	9.60604110-02	6.46601110-02	6.07866550-02			

THETA = 5.00000 13 DENSITIES

DENSITY	1.43735660-01	2.35140710-02	3.67045370-03	5.67415330-04	9.54313930-05	1.72136150-05	2.72051320-06	3.99604650-07
KAPPA(P)	3.12084710+05	1.93745340+05	9.48223050+04	2.19507590+04	3.09472720+03	7.39547160+02	1.66033730+02	3.35091990+01
KAPPA(R)	7.63527970+04	3.77046970+04	1.27844889+04	2.95803890+03	5.24462000+02	1.19007317+02	3.31057306+01	7.87494300+00
DENSITY	5.75950130-08	6.62086270-09	7.00203610-10	7.05020150-11	6.15436240-12			
KAPPA(P)	5.22749010+00	6.84704400-01	2.10820550-01	9.70378650-02	8.90830600-02			
KAPPA(R)	1.44348030+00	3.04500060-01	1.18471363-01	8.61987160-02	8.66054950-02			

THETA = 7.00000 13 DENSITIES

DENSITY	1.54644170-01	2.51271840-02	4.18709560-03	6.99017070-04	1.16172900-04	2.04470920-05	3.38671560-06	5.08812150-07
KAPPA(P)	2.07015450+05	1.98320550+05	8.56950750+04	2.02585650+04	4.19542090+03	8.06954260+02	1.50822990+02	2.99970700+01
KAPPA(R)	1.73857470+05	5.80163410+04	1.22256425+04	2.80827040+03	6.99726810+02	1.39290156+02	3.64680400+01	8.00982890+00

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 7.00000 CONTINUED

DENSITY	7.15200630-08	6.43159300-09	6.99366960-10	6.94665670-11	7.61609500-12
KAPPA(P)	3.16700-10+00	9.62131420-01	2.10100400-01	1.18007402-01	1.10310490-01
KAPPA(R)	1.54409145+00	3.39959100-01	1.40090900-01	1.19990090-01	1.19084777-01

THETA = 10.00000 13 DENSITIES

DENSITY	1.62011630-01	3.08551440-02	5.19834120-03	9.66765600-04	1.47869120-04	2.00000550-05	4.20707100-06	[illegible]
KAPPA(P)	2.40193460+05	1.58267190+05	7.82942910+04	1.01110180+04	3.66463470+03	7.23000340+02	1.40291970+02	[illegible]
KAPPA(R)	1.59300780+05	7.22326590+04	1.50708275+05	3.36785523+03	7.56719740+02	1.91070300+02	3.95000450+01	[illegible]
DENSITY	7.19301400-06	1.03502255-06	1.17844519-09	1.19009080-10	1.00400710-11			
KAPPA(P)	4.52219720+00	6.16407460-01	2.22241420-01	1.52576040-01	1.92463660-01			
KAPPA(R)	1.52061537+00	3.38553100-01	1.67958050-01	1.44910780-01	1.49246790-01			

THETA = 15.00000 13 DENSITIES

DENSITY	2.35277380-01	4.02724790-02	6.77372610-03	1.19275791-03	1.90035150-04	3.30010330-05	5.70999020-06	8.93061070-07
KAPPA(P)	1.73250600+05	1.13496766+05	4.99171090+04	1.13734035+04	2.35362200+03	4.08590400+02	1.00111140+02	1.97032060+01
KAPPA(R)	1.03426651+05	5.14952130+04	1.48504976+04	3.32496020+03	7.48091620+02	1.00710400+02	3.70693310+01	6.05670730+00
DENSITY	1.25255430-07	1.52261740-08	1.74128949-09	1.84210880-10	1.73291720-11			
KAPPA(P)	3.54462360+00	6.57740570-01	2.20164870-01	1.67019620-01	1.61340380-01			
KAPPA(R)	1.10968463+00	3.14189850-01	1.81787290-01	1.60901160-01	1.58215540-01			

THETA = 22.49999 13 DENSITIES

DENSITY	3.13679560-01	5.42009420-02	9.23026990-03	1.57813423-03	2.74939920-04	4.94341560-05	8.37093370-06	1.36904108-06
KAPPA(P)	1.04984702+05	7.40567310+04	3.34153270+04	7.61940750+03	1.52223800+03	2.99209180+02	5.78068930+01	9.23049790+00
KAPPA(R)	4.63768010+04	3.34263560+04	1.27539201+04	3.11949970+03	7.07611310+02	1.35054040+02	2.11126830+01	3.07820300+00
DENSITY	2.08553550-07	2.70659330-08	3.18351480-09	3.38238500-10	3.18342040-11			
KAPPA(P)	1.44951365+00	3.23255900-01	1.79882210-01	1.62732750-01	1.60932220-01			
KAPPA(R)	5.71491630-01	2.20904020-01	1.69501750-01	1.60436670-01	1.58178200-01			

THETA = 33.99998 13 DENSITIES

DENSITY	4.47796400-01	7.81565040-02	1.32490295-02	-2.32812050-03	4.23991140-04	8.15292270-05	1.00241744-05	2.51941610-06
KAPPA(P)	5.85396090+04	3.94034210+04	1.38720032+04	3.01768400+03	5.76867700+02	1.01847131+02	1.70609620+01	2.83183240+00
KAPPA(R)	1.63197767+04	1.36583167+04	7.54352580+03	1.96281900+03	3.08502510+02	4.39234340+01	6.21313740+00	1.09272556+00
DENSITY	3.80675510-07	5.02643400-08	5.91342930-09	6.28295840-10	5.91331100-11			
KAPPA(P)	5.53492600-01	2.10572130-01	1.66554120-01	1.61357640-01	1.60806740-01			
KAPPA(R)	3.35791450-01	1.96901040-01	1.64819390-01	1.58644250-01	1.57912690-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 50.00000 13 DENSITIES

DENSITY	6.49503470-01	1.14984148-01	2.02269790-02	3.76490590-03	7.27362950-04	1.43875540-04	2.63601160-05	4.48227820-06
KAPPA(P)	3.13027410+04	1.65222850+04	5.26377620+03	9.71450860+02	1.69299440+02	3.05483280+01	5.43276920+00	1.01569019+00
KAPPA(R)	4.83621010+03	3.66185040+03	1.75616890+03	4.88801260+02	9.32510150+01	1.50113172+01	2.73185549+00	6.27900660-01
DENSITY	6.89444270-07	6.95463100-08	1.04548701-08	1.04694123-09	9.44151170-11			
KAPPA(P)	2.86122050-01	1.77677710-01	1.64446990-01	1.69328100-01	1.79634690-01			
KAPPA(R)	2.51446610-01	1.72934730-01	1.61048450-01	1.66002900-01	1.76311310-01			

THETA = 69.99998 13 DENSITIES

DENSITY	9.40360480-01	1.71528130-01	3.15861990-02	6.08687180-03	1.19802008-03	2.37875780-04	4.35461100-05	7.30157060-06
KAPPA(P)	1.45364400+04	6.92433240+03	1.89061780+03	3.80139380+02	6.22325370+01	1.12189227+01	2.18772190+00	6.01361630-01
KAPPA(R)	1.56990590+03	8.96766030+02	3.38894190+02	8.90073520+01	1.94027140+01	4.22666800+00	1.01212391+00	3.60461100-01
DENSITY	1.07284137-06	1.31417040-07	1.45617164-08	1.49452145-09	1.39841730-10			
KAPPA(P)	2.95300380-01	2.13376730-01	2.00614530-01	2.00752590-01	2.00906630-01			
KAPPA(R)	2.14615760-01	1.86804810-01	1.90643710-01	1.96169150-01	1.97158960-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.46005162+00	2.76056140-01	5.27099000-02	1.02736596-02	2.00388600-03	3.82931280-04	6.63370500-05	1.06426616-05
KAPPA(P)	5.82349220+03	2.16521080+03	5.29705970+02	1.14236739+02	3.17591850+01	1.15922871+01	3.72820360+00	1.09660013+00
KAPPA(R)	6.73601700+02	2.67397140+02	8.65543010+01	2.04948970+01	5.51920590+00	1.78672170+00	6.70407060-01	3.21649130-01
DENSITY	1.57781448-06	2.03152280-07	2.38607940-08	2.53541160-09	2.38622130-10			
KAPPA(P)	3.73565960-01	2.24432110-01	2.03683290-01	2.01198560-01	2.00941790-01			
KAPPA(R)	2.23015300-01	2.01297770-01	1.98088180-01	1.97583100-01	1.97300170-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.53958720+00	4.83531360-01	9.13027830-02	1.70728970-02	3.19187100-03	6.09743010-04	1.10131487-04	1.86470990-05
KAPPA(P)	4.00110640+03	1.50842290+03	4.57760440+02	1.47141830+02	4.36043960+01	1.12061001+01	2.43427690+00	5.92779960-01
KAPPA(R)	6.93628120+02	2.11716680+02	5.92108610+01	1.64998380+01	4.44460710+00	1.17901363+00	4.34039760-01	2.96979230-01
DENSITY	2.80609720-06	3.72326250-07	4.38377820-08	4.49771970-09	4.38373510-10			
KAPPA(P)	2.56915000-01	2.07200860-01	2.01382540-01	2.01009820-01	2.00985200-01			
KAPPA(R)	2.13294090-01	2.03121080-01	1.97922050-01	1.97435170-01	1.97411680-01			

THETA = 224.99990 13 DENSITIES

DENSITY	4.30957750+00	8.11947730-01	1.44534710-01	2.87163410-02	5.51083480-03	1.04697903-03	2.61306580-04	3.48880000-05
KAPPA(P)	3.56705650+03	1.28004800+03	3.58449000+02	8.81473300+01	1.81166603+01	3.85019570+00	6.70373350-01	3.07760310-01
KAPPA(R)	6.36005420+02	2.82450880+02	7.50134890+01	1.80169864+01	8.71036050+00	7.32760630-01	3.60139008-01	2.84300920-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99990 CONTINUED

DENSITY	5.20576590-06	6.84546000-07	8.05345190-08	8.55679600-09	8.05345310-10
KAPPA(P)	2.12716920-01	2.02282300-01	2.01472170-01	2.01398450-01	2.01390390-01
KAPPA(R)	2.07628260-01	1.98030610-01	1.98161280-01	1.98111150-01	1.98105800-01

THETA = 340.00012 13 DENSITIES

DENSITY	7.45239080+00	1.37776234+00	2.61967710-01	5.11192920-02	1.01925422-02	2.03536120-03	3.74024590-04	6.35802360-05
KAPPA(P)	2.03905440+03	6.91139710+02	1.44875820+02	2.87398300+01	5.78251080+00	1.29190722+00	3.77678570-01	2.22369920-01
KAPPA(R)	6.06175150+02	2.40908680+02	5.42563790+01	1.02220974+01	2.04699200+00	6.09310190-01	2.82113720-01	2.09020860-01
DENSITY	9.76147760-06	1.27159327-06	1.49598620-07	1.59948623-08	1.49598662-09			
KAPPA(P)	2.04024950-01	2.02920720-01	2.01799030-01	2.01842010-01	2.01839190-01			
KAPPA(R)	1.99724470-01	1.98678760-01	1.98570320-01	1.98622550-01	1.98621150-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.24983292+01	2.37316240+00	4.61359370-01	9.12368870-02	1.81642300-02	3.62923290-03	6.66990350-04	1.13305202-04
KAPPA(P)	6.39650700+02	2.06178510+02	4.45783800+01	8.88896820+00	1.90857519+00	4.98047510-01	2.40484650-01	2.05965410-01
KAPPA(R)	1.43174330+02	4.60986910+01	1.18060319+01	2.49475340+00	6.39843860-01	2.85728280-01	2.12598680-01	1.99772110-01
DENSITY	1.74437350-05	2.26768740-06	2.66785730-07	2.83460000-08	2.66785820-09			
KAPPA(P)	2.01661240-01	2.01034940-01	2.00952240-01	2.00942390-01	2.00941190-01			
KAPPA(R)	1.98046590-01	1.97791270-01	1.97757050-01	1.97752900-01	1.97752510-01			

THETA = 699.99975 13 DENSITIES

DENSITY	2.00912010+01	3.63256380+00	7.61527950-01	1.51014100-01	3.00836640-02	6.01160210-03	1.10487620-03	1.87022720-04
KAPPA(P)	3.50001340+02	8.52927950+01	1.72589860+01	3.69968240+00	8.51094760-01	3.02890780-01	2.13607300-01	2.01096770-01
KAPPA(R)	3.46915090+01	1.02045120+01	2.30271410+00	6.46095390-01	3.00011940-01	2.19881170-01	2.00550530-01	1.96870920-01
DENSITY	2.98955370-05	3.75643600-06	4.41931910-07	4.69552910-08	4.41932040-09			
KAPPA(P)	1.99127490-01	1.98849510-01	1.98812920-01	1.98808540-01	1.98808150-01			
KAPPA(R)	1.96205030-01	1.96120110-01	1.96108740-01	1.96107360-01	1.96107160-01			

THETA = 999.99967 13 DENSITIES

DENSITY	3.34930920+01	6.51058280+00	1.29174910+00	2.57758030-01	5.13626000-02	1.02644483-02	1.88653586-03	3.20701440-04
KAPPA(P)	1.27943013+02	3.46000440+01	7.34539790+00	1.55439528+00	4.31241420-01	2.33068700-01	2.01174810-01	1.96483660-01
KAPPA(R)	7.59775020+00	2.44083230+00	6.73825050-01	3.07537580-01	2.23530140-01	2.01414970-01	1.95605960-01	1.94391330-01
DENSITY	4.93383990-05	6.41398400-06	7.54583490-07	8.01745390-08	7.54583720-09			
KAPPA(P)	1.95756040-01	1.95643130-01	1.95628270-01	1.95626310-01	1.95626120-01			
KAPPA(R)	1.94203440-01	1.94173920-01	1.94169840-01	1.94169450-01	1.94169450-01			

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA = 1499.99950   13 DENSITIES

DENSITY	5.99540420+01	1.19287640+01	2.37130550+00	4.72553830-01	9.43545300-02	1.00567940-02	3.46570200-03	5.09165750-04
KAPPA(P)	2.05216070+01	6.85477850+00	1.56820561+00	4.39951490-01	2.34118470-01	1.90940570-01	1.88481010-01	1.88107240-01
KAPPA(R)	1.10635654+00	4.05691410-01	2.48443700-01	2.07105280-01	1.95764470-01	1.91914750-01	1.91134290-01	1.90966350-01
DENSITY	9.00404300-05	1.17832690-05	1.38626156-06	1.47290350-07	1.38626179-08			
KAPPA(P)	1.88054480-01	1.88046310-01	1.88045180-01	1.88045000-01	1.88045000-01			
KAPPA(R)	1.90946000-01	1.90943060-01	1.90942670-01	1.90942670-01	1.90942670-01			

THETA = 2249.99670   13 DENSITIES

DENSITY	1.09750431+02	2.18657120+01	4.35471420+00	8.68047710-01	1.73335850-01	3.46619470-02	6.36704410-03	1.00236591-03
KAPPA(P)	9.59664003+00	2.18200630+00	5.52427200-01	2.43891940-01	1.95675220-01	1.89177040-01	1.88207160-01	1.88072640-01
KAPPA(R)	6.23251460-01	2.99714170-01	2.20550850-01	1.99040090-01	1.92988050-01	1.91385800-01	1.91001500-01	1.90953370-01
DENSITY	1.66517030-04	2.10472980-05	2.54673090-06	2.70590310-07	2.54673170-08			
KAPPA(P)	1.88049020-01	1.88045560-01	1.88045180-01	1.88045000-01	1.88045000-01			
KAPPA(R)	1.90944200-01	1.90942870-01	1.90942670-01	1.90942670-01	1.90942670-01			

THETA = 3400.00050   13 DENSITIES

DENSITY	2.03473540+02	4.06250140+01	8.08717920+00	1.61236234+00	3.21978020-01	6.43495070-02	1.18272040-02	2.01856810-03
KAPPA(P)	4.96484260+00	1.02899336+00	3.29041300-01	2.09108430-01	1.90838450-01	1.88508530-01	1.88116090-01	1.88057030-01
KAPPA(R)	3.96603290-01	2.45934260-01	2.06099130-01	1.94966600-01	1.91890760-01	1.91146520-01	1.90969600-01	1.90947260-01
DENSITY	3.09316080-04	4.02110000-05	4.73073520-06	5.02640840-07	4.73073670-08			
KAPPA(P)	1.88046070-01	1.88045370-01	1.88045000-01	1.88045000-01	1.88045000-01			
KAPPA(R)	1.90943250-01	1.90942670-01	1.90942670-01	1.90942670-01	1.90942670-01			

THETA = 4999.99870   13 DENSITIES

DENSITY	3.62494060+02	7.18045930+01	1.43727776+01	2.87530560+00	5.74194260-01	1.14757509-01	2.10920300-02	3.58594780-03
KAPPA(P)	2.10624440+00	5.55605310-01	2.44403320-01	1.95729630-01	1.89184980-01	1.88228050-01	1.88077720-01	1.88050640-01
KAPPA(R)	2.96993030-01	2.20744360-01	1.99090450-01	1.92999440-01	1.91388470-01	1.91012380-01	1.90955280-01	1.90944780-01
DENSITY	3.51620690-04	7.17105330-05	8.43652640-06	8.96381310-07	8.43652890-08			
KAPPA(P)	1.88045930-01	1.88045180-01	1.88045000-01	1.88045000-01	1.88045000-01			
KAPPA(R)	1.90942670-01	1.90942670-01	1.90942670-01	1.90942670-01	1.90942670-01			

THETA = 6999.99090   13 DENSITIES

DENSITY	6.00146060+02	1.19059096+02	2.38072450+01	4.75697980+00	9.51149190-01	1.90095020-01	3.49389850-02	5.93946660-03
KAPPA(P)	1.17305067+00	3.58717900-01	2.12611860-01	1.91402640-01	1.88597150-01	1.88135470-01	1.88061730-01	1.88047010-01
KAPPA(R)	2.52999690-01	2.08261040-01	1.95584450-01	1.92019750-01	1.91184570-01	1.90976670-01	1.90949170-01	1.90943630-01

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA =   6999.99690   CONTINUED

DENSITY	9.13759340-04	1.18788743-04	1.39751482-05	1.48486010-06	1.39751500-07
KAPPA(P)	1.88045520-01	1.88045180-01	1.88045000-01	1.88045006-01	1.88045000-01
KAPPA(R)	1.90942570-01	1.90942670-01	1.90942670-01	1.90942670-01	1.90942670-01

THETA =   9999.99520   13   DENSITIES

DENSITY	1.02436170+03	2.03263940+02	4.05486240+01	8.12230520+00	1.62405253+00	3.24582350-01	5.96572070-02	1.01414631-02
KAPPA(P)	6.44707593-01	2.61308910-01	1.98102440-01	1.89488490-01	1.88284150-01	1.88089000-01	1.88053080-01	1.88046500-01
KAPPA(R)	2.25818060-01	2.00663680-01	1.93409220-01	1.91477300-01	1.91042180-01	1.90959670-01	1.90945730-01	1.90943060-01
DENSITY	1.56021760-03	2.02928060-04	2.38620800-05	2.53534710-06	2.38620840-07			
KAPPA(P)	1.88045160-01	1.88045000-01	1.88045000-01	1.88045000-01	1.88045000-01			
KAPPA(R)	1.90942670-01	1.90942670-01	1.90942670-01	1.90942670-01	1.90942670-01			

57 DIANE/SCAT PHENOLIC-1A TEMP(.861667-34.)EV. SADT INPUT TAPE 1250 11-8-67 MATERL = 1107 NX = 451

GREY ABSORPTION COEFFICIENTS 11 TEMPERATURES

THETA =	.86667		13 DENSITIES					
DENSITY	1.77606960+01	2.11536390+00	1.58498520-01	9.06119770-03	4.46668440-04	2.12069050-05	1.02416805-06	7.22965100-08
KAPPA(P)	1.71445290+05	1.04576066+05	8.59385530+04	4.11064350+04	1.18568848+04	3.67116370+03	1.33209210+03	3.69276230+02
KAPPA(R)	1.62489020+03	1.51567470+03	1.20449650+03	7.54908060+02	4.54198790+02	2.73303700+02	1.38409530+02	4.40053400+01
DENSITY	6.57402490-09	6.37342470-10	7.03709950-11	7.41237770-12	6.94919850-13			
KAPPA(P)	7.64907060+01	1.18049855+01	1.45231696+00	2.01197260-01	6.09425300-02			
KAPPA(R)	9.36231670+00	1.47014346+00	2.33566350-01	7.75314200-02	5.73230790-02			
THETA =	1.00000		13 DENSITIES					
DENSITY	4.52620100+00	4.98241490-01	3.57631590-02	2.02132110-03	1.04852707-04	6.25249400-06	4.95201290-07	5.04355330-08
KAPPA(P)	3.24665260+05	2.09949900+05	1.76074040+05	8.52096520+04	2.61336740+04	7.68544790+03	1.88771600+03	3.98978030+02
KAPPA(R)	6.02418570+03	5.30234490+03	3.90999520+03	2.49792820+03	1.50328350+03	7.32681410+02	2.21972150+02	4.67786530+01
DENSITY	6.08639510-09	7.47542620-10	8.71099640-11	9.12293150-12	7.76603860-13			
KAPPA(P)	6.60707660+01	8.43014030+00	1.00173945+00	1.60218940-01	7.60891940-02			
KAPPA(R)	7.52226260+00	9.93080130-01	1.72254370-01	7.28126930-02	6.52883290-02			
THETA =	1.50000		13 DENSITIES					
DENSITY	3.24187900-01	3.05991510-02	2.23899360-03	1.71073890-04	1.75724200-05	2.50889050-06	4.11482260-07	6.74063070-08
KAPPA(P)	9.05923350+05	6.46203230+05	5.18179640+05	2.11508400+05	4.40187050+04	7.36735390+03	1.11130000+03	1.63976800+02
KAPPA(R)	1.13214541+05	7.96916350+04	4.54482660+04	2.00194380+04	5.28713050+03	9.70123530+02	1.52416010+02	2.51095690+01
DENSITY	9.74189670-09	1.06731472-09	1.11934213-10	1.13704887-11	1.04093687-12			
KAPPA(P)	2.69967900+01	5.12775010+00	8.11342900-01	1.68418050-01	9.34822240-02			
KAPPA(R)	5.37650750+00	1.23174379+00	2.58057970-01	1.08767032-01	8.72703950-02			
THETA =	2.25000		13 DENSITIES					
DENSITY	7.96602330-02	6.19579580-03	8.70722710-04	1.18656951-04	2.03440930-05	3.67230900-06	5.70296030-07	8.70500010-08
KAPPA(P)	1.14228550+06	7.49559700+05	4.24555320+05	1.12150831+05	1.97716800+04	3.99151400+03	8.89979000+02	1.59461240+02
KAPPA(R)	5.89342250+05	3.62713360+05	1.41919430+05	3.50608330+04	6.46006670+03	1.31839780+03	2.72203780+02	4.32967240+01
DENSITY	1.26422691-03	1.58193060-09	1.68155030-10	1.59671140-11	1.43373267-12			
KAPPA(P)	2.44693720+01	3.10513120+00	5.47247610-01	1.71040860-01	1.20001144-01			
KAPPA(R)	6.23220990+00	9.20613620-01	2.31890500-01	1.33268680-01	1.14890519-01			
THETA =	3.40000		13 DENSITIES					
DENSITY	5.01155470-02	6.74503920-03	1.00160759-03	1.61059950-04	2.71029690-05	4.90605710-06	8.29203700-07	1.25436020-07
KAPPA(P)	9.26231910+05	5.43127800+05	3.20661050+05	1.02094401+05	1.93844770+04	3.36200500+03	6.30230910+02	1.20120011+02
KAPPA(R)	6.97403680+03	4.21026030+05	1.58450090+05	3.63572850+04	6.19497020+03	1.02751430+03	1.90652610+02	3.70546910+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA =	3.00000	CONTINUED						
DENSITY	1.77321000-03	2.15356900-09	2.23615430-10	2.28808720-11	2.09677640-12			
KAPPA(P)	1.84722930+01	2.65098350+00	5.04513140-01	1.85388250-01	1.48094600-01			
KAPPA(R)	5.70455510+00	9.09534260-01	2.57452770-01	1.59890180-01	1.43640730-01			
THETA =	5.00000		13 DENSITIES					
DENSITY	5.15932720-02	9.21544810-03	1.30235365-03	2.18425860-04	3.79534560-05	6.75059450-06	1.13262799-06	1.74545560-07
KAPPA(P)	6.51587170+05	4.28931890+05	2.47520800+05	7.52491560+04	1.61860321+04	2.82692260+03	4.58005380+02	7.68568020+01
KAPPA(R)	3.90506530+05	3.02298410+05	1.21694596+05	2.89003770+04	5.51728930+03	9.52821870+02	1.69021680+02	2.85856820+01
DENSITY	2.50768710-08	3.16504040-09	3.68470700-10	3.85236050-11	3.57731070-12			
KAPPA(P)	1.23743721+01	1.73948726+00	3.31460050-01	1.68115340-01	1.51863370-01			
KAPPA(R)	4.02102950+00	6.32497890-01	2.13601750-01	1.55536630-01	1.49046040-01			
THETA =	7.00000		13 DENSITIES					
DENSITY	6.24803090-02	1.03700755-02	1.71107512-03	2.92490620-04	5.11919630-05	9.19601890-06	1.57707302-06	2.60589380-07
KAPPA(P)	4.50093170+05	3.00216740+05	1.69859630+05	4.81655780+04	9.13228260+03	1.58113450+03	2.57267130+02	3.84333260+01
KAPPA(R)	1.91784950+05	1.70447040+05	8.90354530+04	2.27490900+04	4.18767500+03	7.49353580+02	1.03403724+02	1.36510027+01
DENSITY	3.93570060-08	5.03622100-09	5.83801640-10	6.11060660-11	5.73037670-12			
KAPPA(P)	5.85686010+00	6.78495670-01	2.38703770-01	1.64225140-01	1.55863750-01			
KAPPA(R)	2.18444270+00	4.30457320-01	1.93526660-01	1.60727480-01	1.53242450-01			
THETA =	10.00000		13 DENSITIES					
DENSITY	8.19134410-02	1.37719963-02	2.38632920-03	4.15147790-04	7.47214790-05	1.42224341-05	2.54726590-06	4.25428060-07
KAPPA(P)	2.69914350+05	1.85665120+05	9.23960890+04	2.40132240+04	4.19524040+03	6.52759630+02	1.03190103+02	1.65131810+01
KAPPA(R)	7.61597670+04	7.26522730+04	4.71099700+04	1.49907387+04	2.54893260+03	3.40972890+02	4.84977770+01	7.10101690+00
DENSITY	6.44259060-08	6.32310930-09	9.78167800-10	1.03916970-10	9.78031090-12			
KAPPA(P)	2.64595560+00	4.75736620-01	1.92403990-01	1.58894950-01	1.55378530-01			
KAPPA(R)	1.10924066+00	3.06208810-01	1.79110200-01	1.55948720-01	1.52728260-01			
THETA =	15.00000		13 DENSITIES					
DENSITY	1.19240000-01	2.09006300-02	3.67293210-03	6.75252420-04	1.28166940-04	2.48811540-05	4.51258730-06	7.64273610-07
KAPPA(P)	1.30604636+05	8.03526150+04	3.52045250+04	7.68314230+03	1.30808950+03	2.16550750+02	3.37693630+01	5.36877620+00
KAPPA(R)	2.31236220+04	2.04449450+04	1.44534578+04	5.62681560+03	1.03666380+03	1.53875210+02	2.05532480+01	2.96312650+00
DENSITY	1.17493333-07	1.52703930-08	1.79457072-09	1.88868540-10	1.67963420-11			
KAPPA(P)	9.15520040-01	2.52209300-01	1.66542950-01	1.58083640-01	1.66081610-01			
KAPPA(R)	5.77989080-01	2.22735570-01	1.63961930-01	1.55358330-01	1.63007630-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 22.49999 13 DENSITIES

DENSITY	1.90415430-01	3.36384040-02	6.21952350-03	1.17871554-03	2.28207010-04	4.50381830-05	8.23341270-06	1.38096200-06
KAPPA(P)	5.55488050+04	3.14432610+04	1.09966799+04	2.21940390+03	3.69536290+02	6.29602110+01	1.11333262+01	2.35179250+00
KAPPA(R)	7.60237510+03	5.41825930+02	3.17989170+03	1.20796260+03	2.42422240+02	4.02676330+01	6.86189740+00	1.39952333+00

DENSITY	2.02240460-07	2.45337150-08	2.80001790-09	2.79399080-10	2.51498320-11
KAPPA(P)	7.44942080-01	2.96379370-01	2.00354290-01	1.97359170-01	2.037[illegible]780-01
KAPPA(R)	4.16220260-01	2.14895590-01	1.55265190-01	1.91916670-01	1.99862230-01

THETA = 33.99999 13 DENSITIES

DENSITY	3.16435770-01	5.80777300-02	1.09601342-02	2.11620900-03	4.07304700-04	7.64211620-05	1.32766999-05	2.18358010-06
KAPPA(P)	2.52881170+04	1.06747870+04	3.22049670+03	6.65340520+02	1.75052330+02	5.44237690+01	1.38137432+01	3.44107090+00
KAPPA(R)	3.73275170+03	1.83859320+03	7.14680780+02	1.90918750+02	4.61866110+01	1.11592637+01	2.56690700+00	7.46005720-01

DENSITY	3.11340410-07	3.95089020-08	4.59544610-09	4.02239620-10	4.50147930-11
KAPPA(P)	8.96015990-01	3.02288630-01	2.18985660-01	2.10036150-01	2.11305990-01
KAPPA(R)	3.16412990-01	2.20852320-01	2.05773960-01	2.06129220-01	2.07484220-01

4 DIANE/SCAT OPLYCA 19 FREQ. TEMP.(1.-2250.) CI/RTW-AFWL 11-25-66 MATERL = 1124 NX = 861

GREY ABSORPTION COEFFICIENTS 21 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	1.30501067+00	1.49244840-01	1.15042933-02	8.41026850-04	8.08818590-05	1.05153971-05	1.20121142-06	1.11056405-07
KAPPA(P)	1.59224921+04	1.34946320+04	1.18644520+04	8.13792060+03	3.72017470+03	1.30150420+03	5.87557980+02	1.35666130+02
KAPPA(R)	5.78510630+02	5.16334310+02	7.55315830+02	5.01047490+02	3.33126400+02	1.36855130+02	4.52808390+01	1.39873306+01
DENSITY	1.21499395-08	1.35750149-09	1.49093140-10	1.56204540-11	1.45390231-12			
KAPPA(P)	2.34927040+01	3.75957150+00	5.21863460-01	8.51987100-02	3.81389580-02			
KAPPA(R)	3.14706090+00	5.66841010-01	1.11048859-01	4.57875980-02	3.47644840-02			

THETA = 1.50000 13 DENSITIES

DENSITY	2.80284010-01	3.21040530-02	3.19117840-03	3.38833760-04	3.71090410-05	4.96215760-06	7.52375760-07	1.17639617-07
KAPPA(P)	6.90520030+04	5.41195070+04	4.30169670+04	2.49211150+04	8.88007150+03	2.23792840+03	5.01924130+02	7.94470640+01
KAPPA(R)	9.60326930+03	6.18327720+03	5.31227780+03	3.99926510+03	1.32996100+03	6.06760390+02	1.42039320+02	2.33359708+01
DENSITY	1.75478090-08	2.21713530-09	2.41425540-10	2.07521790-11	1.67965973-12			
KAPPA(P)	1.14772003+01	1.58089619+00	2.70973840-01	8.90747830-02	5.78442050-02			
KAPPA(R)	3.25103290+00	4.93436150-01	1.10140772-01	5.97566370-02	5.45383040-02			

THETA = 2.25000 13 DENSITIES

DENSITY	1.22335255-01	1.45090744-02	1.63295668-03	2.21673500-04	3.67504530-05	6.75802470-06	1.14955003-06	1.66560050-07
KAPPA(P)	1.37522030+05	9.67256330+04	6.04550380+04	2.22834580+04	5.89721140+03	1.23999910+03	2.60957650+02	6.50013450+01
KAPPA(R)	6.45706050+04	4.45054710+04	2.56103000+04	9.88776010+03	2.61639570+03	5.77751560+02	1.26164667+02	2.57296740+01
DENSITY	2.12578040-08	2.55692660-09	2.64223600-10	2.80453020-11	2.35870140-12			
KAPPA(P)	1.31537774+01	1.87229169+00	2.96768760-01	9.30664990-02	7.26406920-02			
KAPPA(R)	4.42058090+00	6.54493960-01	1.44193370-01	7.52003040-02	7.02163560-02			

THETA = 3.40000 13 DENSITIES

DENSITY	5.45502490-02	1.19221295-02	1.92126313-03	3.01890300-04	5.00730860-05	8.36821480-06	1.38458524-06	2.15984340-07
KAPPA(P)	1.33970020+05	7.60373490+04	3.85727270+04	1.79643390+04	5.88136940+03	1.73858870+03	3.26949800+02	5.62568500+01
KAPPA(R)	1.15454024+05	6.96041920+04	3.13920486+04	1.11107003+04	3.03993040+03	6.84550900+02	1.25344999+02	2.32482520+01
DENSITY	2.97371490-08	3.49756050-09	3.95440880-10	4.04732490-11	3.47307790-12			
KAPPA(P)	9.54596900+00	1.47636486+00	2.50408930-01	9.96783270-02	8.89530130-02			
KAPPA(R)	3.92136720+00	6.18517560-01	1.51934156-01	8.94363570-02	8.69506990-02			

THETA = 5.00000 13 DENSITIES

DENSITY	8.83956960-02	1.47373829-02	2.32112330-03	3.74702580-04	6.45283480-05	1.13270150-05	1.86374990-06	2.97846290-07
KAPPA(P)	1.08300016+05	6.35931560+04	3.54004530+04	1.79687950+04	5.11410090+03	1.14028210+03	2.10015070+02	3.69985960+01
KAPPA(R)	9.38037540+04	5.43978500+04	2.47784570+04	9.53229590+03	2.62134540+03	5.59604890+02	1.01448464+02	1.70353220+01

GHEY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	4.27052730-08	5.12866770-09	5.77659660-10	5.73688370-11	5.10000390-12
KAPPA(P)	6.41153150+00	1.03158520+00	2.14595590-01	1.19531852-01	1.06582280-01
KAPPA(R)	2.75326420+00	4.57780820-01	1.47840250-01	1.07031401-01	1.04613046-01

THETA = 7.00000 13 DENSITIES

DENSITY	1.05345500-01	1.77948160-02	2.91023340-03	4.85673500-04	8.42024180-05	1.53422530-05	2.56000300-06	4.10004930-07
KAPPA(P)	9.16397090+04	5.45691860+04	3.48925960+04	1.48229353+04	3.74361110+03	7.89335120+02	1.51490630+02	2.79099060+01
KAPPA(R)	7.35492050+04	4.63737990+04	2.46859600+04	8.32180090+03	1.78027120+03	3.66863160+02	6.88101900+01	1.26479731+01
DENSITY	5.89091170-08	7.16555770-09	7.88097110-10	7.73082980-11	7.08791530-12			
KAPPA(P)	6.16067280+00	9.60861600-01	2.14394820-01	1.34514940-01	1.26035590-01			
KAPPA(R)	2.03275110+00	3.69227420-01	1.56532440-01	1.28110840-01	1.23961777-01			

THETA = 10.00000 13 DENSITIES

DENSITY	1.35570020-01	2.33092730-02	3.91254980-03	6.66331020-04	1.10177000-04	2.16492460-05	3.66240720-06	5.74300050-07
KAPPA(P)	7.77246210+04	4.85213890+04	2.86996430+04	1.14496104+04	2.69229410+03	5.67000300+02	1.11654570+02	2.11763920+01
KAPPA(R)	5.44201020+04	3.84141010+04	1.79915580+04	5.46169210+03	1.18307110+03	2.50285670+02	4.91420810+01	8.88727410+00
DENSITY	8.15519740-08	1.02331448-08	1.17372915-09	1.22726850-10	1.13112872-11			
KAPPA(P)	3.72409540+00	6.35824610-01	1.92419230-01	1.37355480-01	1.34177600-01			
KAPPA(R)	1.34057731+00	2.99447750-01	1.55227110-01	1.32997760-01	1.32429080-01			

THETA = 15.00000 13 DENSITIES

DENSITY	1.85410670-01	3.29581730-02	5.66872190-03	9.62044440-04	1.74266870-04	3.18383210-05	5.51504920-06	9.07983160-07
KAPPA(P)	5.92416600+04	3.95926940+04	2.24999850+04	7.62302810+03	1.78530210+03	3.54942900+02	6.17409490+01	1.00315504+01
KAPPA(R)	3.77458150+04	2.86228290+04	1.41776627+04	4.19778770+03	4.47173170+02	1.63052190+02	2.62956870+01	4.18594850+00
DENSITY	1.36478530-07	1.73509280-08	1.99460460-09	2.07371340-10	1.09892180-11			
KAPPA(P)	1.63574403+00	3.42446440-01	1.65241700-01	1.45709840-01	1.46504810-01			
KAPPA(R)	7.73452230-01	2.34267880-01	1.55535850-01	1.43915780-01	1.44468320-01			

THETA = 22.49999 13 DENSITIES

DENSITY	2.71946420-01	4.60613480-02	8.37752330-03	1.46822650-03	2.71487910-04	5.20833160-05	9.29652470-06	1.53779654-06
KAPPA(P)	4.33780960+04	3.03338620+04	1.42851093+04	4.34336590+03	8.67107480+02	1.45174850+02	2.58270390+01	4.54379690+00
KAPPA(R)	2.62300130+04	2.06850390+04	1.01731976+04	2.73377570+03	4.47310480+02	7.72246690+01	1.38339535+01	2.20162550+00
DENSITY	2.29771630-07	2.89571160-08	3.31009160-09	3.41371450-10	3.12960310-11			
KAPPA(P)	6.77336340-01	2.59862660-01	1.69273760-01	1.60595420-01	1.63093760-01			
KAPPA(R)	4.71636060-01	2.10597830-01	1.63369460-01	1.58016620-01	1.60726520-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 33.99998 13 DENSITIES

DENSITY	4.12499590-01	7.34290960-02	1.31817500-02	2.41520770-03	4.59270140-04	8.84287870-05	1.56999980-05	2.50310100-06
KAPPA(P)	2.70300660+04	1.64321500+04	6.21733080+03	1.59884210+03	3.30976350+02	7.06444780+01	1.59402539+01	3.37712910+00
KAPPA(R)	1.43993440+04	1.02413420+04	4.49976720+03	1.11990250+03	2.11300010+02	3.74480630+01	6.65502350+00	1.36638050+00
DENSITY	3.83297550-07	4.88051540-08	5.55487460-09	5.65755110-10	5.17876270-11			
KAPPA(P)	6.85200000-01	2.38773230-01	1.80748990-01	1.79146530-01	1.82929760-01			
KAPPA(R)	3.63021010-01	1.98007570-01	1.73174070-01	1.76061830-01	1.80401920-01			

THETA = 50.00000 13 DENSITIES

DENSITY	6.54921930-01	1.17679211-01	2.15309250-02	4.02732870-03	7.70140990-04	1.48284770-04	2.61712280-05	4.23448020-06
KAPPA(P)	1.44399751+04	6.79272800+03	2.83708080+03	7.94759820+02	1.83019910+02	4.09152950+01	8.89771920+00	2.06552760+00
KAPPA(R)	7.17190759+03	4.33411100+03	2.04915210+03	5.22598230+02	1.05760170+02	1.93391200+01	3.69923840+00	7.96437430-01
DENSITY	6.24502040-07	7.76048570-08	8.84733140-09	9.29950400-10	8.70846920-11			
KAPPA(P)	5.32115590-01	2.45001730-01	1.99876610-01	1.93809990-01	1.93889080-01			
KAPPA(R)	2.93512950-01	2.04978940-01	1.93257840-01	1.90932920-01	1.91203300-01			

THETA = 69.99998 13 DENSITIES

DENSITY	9.70537560-01	1.78541350-01	3.29577780-02	6.17696040-03	1.16045051-03	2.19507760-04	3.84977800-05	6.29303480-06
KAPPA(P)	9.17956400+03	4.58223860+03	1.77126970+03	4.98506680+02	1.19476175+02	2.96021200+01	6.92461860+00	1.53990909+00
KAPPA(R)	5.22265570+03	3.14314740+03	1.28836710+03	2.84475140+02	5.25757480+01	1.04012188+01	2.23195830+00	5.73292200-01
DENSITY	9.50440070-07	1.22722510-07	1.44025607-08	1.52963000-09	1.43957930-10			
KAPPA(P)	4.10598240-01	2.23755130-01	1.97764960-01	1.94621620-01	1.94277250-01			
KAPPA(R)	2.64502910-01	2.04750560-01	1.94052020-01	1.92135000-01	1.91611770-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.52175776+00	2.79502510-01	5.08376020-02	9.38180600-03	1.77123194-03	3.41958570-04	6.10966180-05	1.04649397-05
KAPPA(P)	7.03216490+03	3.51243530+03	1.21546610+03	3.04939960+02	7.50756990+01	1.74908340+01	3.48386040+00	7.51622400-01
KAPPA(R)	4.13252670+03	2.35740310+03	8.32196840+02	1.66803750+02	3.25279260+01	6.39127630+00	1.25621494+00	3.79972080-01
DENSITY	1.60762923-06	2.08916770-07	2.45574650-08	2.59458360-09	2.40986590-10			
KAPPA(P)	2.77930050-01	2.05152840-01	1.95767220-01	1.95729630-01	1.98199530-01			
KAPPA(R)	2.33645520-01	2.02635790-01	1.93824340-01	1.93028770-01	1.95370410-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.51343060+00	4.55813070-01	8.32097310-02	1.57980620-02	3.09571000-03	6.15194560-04	1.12792501-04	1.90790170-05
KAPPA(P)	5.19377920+03	2.25032280+03	6.45520490+02	1.44535610+02	3.08510240+01	6.11919150+00	1.29765670+00	3.95337400-01
KAPPA(R)	2.55297330+03	1.35349840+03	4.26239310+02	8.48790210+01	1.55376479+01	2.00184290+00	7.28694570-01	3.24750200-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	2.90182700-06	3.72090040-07	4.33703500-08	4.59866400-09	4.32707200-10			
KAPPA(P)	2.34762010-01	2.06560590-01	2.03130550-01	2.02807500-01	2.02774650-01			
KAPPA(R)	2.25942000-01	2.02281490-01	2.00016380-01	1.99891410-01	1.99879420-01			

THETA = 224.99990 13 DENSITIES

DENSITY	4.10059020+00	7.69543580-01	1.44987900-01	2.63418440-02	5.60404860-03	1.10677269-03	2.00820330-04	3.30724810-05
KAPPA(P)	2.75267600+03	8.97313210+02	2.24401890+02	4.84282460+01	1.13122928+01	2.98073220+00	8.45337890-01	3.24991120-01
KAPPA(R)	1.05252690+03	4.77633630+02	1.44592710+02	3.07509210+01	6.39728690+00	1.50260457+00	4.71914000-01	2.56234300-01
DENSITY	5.19975040-06	6.75636960-07	7.94228290-08	8.41575810-09	7.89359090-10			
KAPPA(P)	2.21400050-01	2.05179300-01	2.03159470-01	2.03444710-01	2.04111880-01			
KAPPA(R)	2.10221010-01	2.02149240-01	2.00565780-01	2.00665480-01	2.01295350-01			

THETA = 340.00012 13 DENSITIES

DENSITY	7.16726700+00	1.36179706+00	2.62264890-01	5.12281030-02	1.01101541-02	2.01125980-03	3.68977840-04	6.25795560-05
KAPPA(P)	1.21215650+03	3.73539730+02	1.05562641+02	2.61643280+01	6.14978420+00	1.43867750+00	4.32484970-01	2.45213010-01
KAPPA(R)	4.65326230+02	1.86137360+02	5.24941620+01	1.08717313+01	2.28126270+00	6.53648790-01	3.07057570-01	2.30507010-01
DENSITY	9.59461680-06	1.24447105-06	1.46309750-07	1.55436620-08	1.46295140-09			
KAPPA(P)	2.11341050-01	2.05556360-01	2.04714480-01	2.04612770-01	2.04603560-01			
KAPPA(R)	2.08135030-01	2.02412170-01	2.01940540-01	2.01797610-01	2.01777840-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.22554530+01	2.34343050+00	4.56074540-01	8.94891520-02	1.78780060-02	3.56217480-03	6.53059710-04	1.10908200-04
KAPPA(P)	5.67906500+02	1.98202840+02	5.03218800+01	1.10982891+01	2.61167060+00	7.49483410-01	3.14769390-01	2.24005870-01
KAPPA(R)	2.47088000+02	1.13550499+02	2.69623910+01	5.11519220+00	1.22392681+00	4.74571540-01	2.72970650-01	2.17794350-01
DENSITY	1.70592460-05	2.21761120-06	2.60894460-07	2.77200480-08	2.60894500-09			
KAPPA(P)	2.07612070-01	2.05130690-01	2.04856190-01	2.04826300-01	2.04823020-01			
KAPPA(R)	2.04960910-01	2.02084570-01	2.01746760-01	2.01712680-01	2.01708840-01			

THETA = 599.99976 13 DENSITIES

DENSITY	1.35769720+01	3.81127200+00	7.47174360-01	1.47849560-01	2.94430610-02	5.88016780-03	1.08052097-03	1.83675490-04
KAPPA(P)	3.17677000+02	9.40282200+01	2.26599250+01	5.34456410+00	1.32304619+00	4.33335640-01	2.44905960-01	2.18560130-01
KAPPA(R)	1.23733061+02	5.63323480+01	1.45694953+01	3.18928490+00	8.33783920-01	3.55322660-01	2.36450590-01	2.07245780-01
DENSITY	2.92572550-05	3.67344740-06	4.32172970-07	4.59183970-08	4.32173040-09			
KAPPA(P)	2.05397730-01	2.04662030-01	2.04567350-01	2.04556100-01	2.04554870-01			
KAPPA(R)	2.02405530-01	2.01754870-01	2.01676770-01	2.01667090-01	2.01666080-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 999.99957 13 DENSITIES

DENSITY	3.27545200+01	6.43212510+00	1.26681742+00	2.51496240-01	5.02046820-02	1.00368495-02	1.84483581-03	3.13616720-04
KAPPA(P)	1.39124020+02	3.96609460+01	9.35703970+00	2.14615700+00	5.94551700-01	2.76624850-01	2.15729920-01	2.06322040-01
KAPPA(R)	4.17976430+01	2.03445890+01	5.99140680+00	1.30970611+00	4.43071160-01	2.48063380-01	2.08406450-01	2.02317100-01
DENSITY	4.82465920-05	6.27228390-06	7.37920340-07	7.84040790-08	7.37920560-09			
KAPPA(P)	2.04462020-01	2.04569400-01	2.04539720-01	2.04535240-01	2.04534830-01			
KAPPA(R)	2.01364410-01	2.01219890-01	2.01200970-01	2.01198760-01	2.01198560-01			

THETA = 1499.99930 13 DENSITIES

DENSITY	5.94094910+01	1.17214556+01	2.32000920+00	4.61618070-01	9.22142160-02	1.84381380-02	3.38915730-03	5.76149720-04
KAPPA(P)	6.07571550+01	1.46655641+01	3.39751290+00	8.24851670-01	3.16281700-01	2.25211120-01	2.07842020-01	2.04750930-01
KAPPA(R)	9.95130720+00	3.64322760+00	1.09032645+00	3.93217300-01	2.41783880-01	2.09125030-01	2.01908020-01	2.00548730-01
DENSITY	8.60362020-05	1.15229491-05	1.35564933-06	1.44037910-07	1.35564990-08			
KAPPA(P)	2.04224550-01	2.04141480-01	2.04130460-01	2.04129230-01	2.04129030-01			
KAPPA(R)	2.00311020-01	2.00273970-01	2.00268960-01	2.00268360-01	2.00268360-01			

THETA = 2249.99070 13 DENSITIES

DENSITY	1.00361034+02	2.14178350+01	4.24878050+00	8.47876240-01	1.69401100-01	3.38727310-02	6.22626930-03	1.05845496-03
KAPPA(P)	2.50513310+01	5.99899920+00	1.35029427+00	4.10701910-01	2.40258460-01	2.09219980-01	2.03176950-01	2.02313460-01
KAPPA(R)	2.09367770+00	7.10327220-01	3.31848410-01	2.34062750-01	2.07552280-01	2.00151640-01	1.98338920-01	1.98128390-01
DENSITY	1.62438930-04	2.11690570-05	2.49046790-06	2.64612320-07	2.49046830-08			
KAPPA(P)	2.02118930-01	2.02088210-01	2.02084160-01	2.02083760-01	2.02083560-01			
KAPPA(R)	1.98064600-01	1.98054700-01	1.98053520-01	1.98053320-01	1.98053320-01			

6 DIANE/SCAT OPLYFE 19 FREQ. TEMP.(1.-2250.) CI/RTW-AFWL 11-20-6800000 MATERL = 1125 NX = 061

GREY ABSORPTION COEFFICIENTS 21 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	1.30561067+00	1.40244440-01	1.15042933-02	8.41026850-04	8.08818590-05	1.05153971-05	1.20121142-06	1.11056405-07
KAPPA(P)	1.59224421+04	1.34846320+04	1.18644520+04	8.13792060+03	3.72017470+03	1.30150420+03	5.07557900+02	1.35666130+02
KAPPA(R)	5.76510630+02	6.16334310+02	7.55315830+02	6.01047490+02	3.33126400+02	1.36855130+02	4.52000390+01	1.39873306+01
DENSITY	1.21499595-08	1.35750149-09	1.49093140-10	1.56204540-11	1.45390231-12			
KAPPA(P)	2.34917090+01	3.75957150+00	5.21863460-01	8.51987100-02	3.81389580-02			
KAPPA(R)	3.14706490+00	5.66841010-01	1.11049859-01	4.57875980-02	3.47644840-02			

THETA = 1.50000 13 DENSITIES

DENSITY	2.90264610-01	3.21040530-02	3.19117840-03	3.38833760-04	3.71090410-05	4.96215760-06	7.52375760-07	1.17639617-07
KAPPA(P)	6.90523530+04	5.41195070+04	4.30169670+04	2.48211150+04	8.88007150+03	2.23792840+03	5.01924130+02	7.94470640+01
KAPPA(R)	9.60326960+03	6.18327720+03	6.31227780+03	3.99926510+03	1.82996100+03	6.06760390+02	1.42039320+02	2.33359700+01
DENSITY	1.75878090-08	2.21713530-09	2.41425540-10	2.07521790-11	1.67965973-12			
KAPPA(P)	1.14772663+01	1.59089618+00	2.70973840-01	8.90747930-02	5.78442050-02			
KAPPA(R)	3.26103290+00	4.33496150-01	1.10140772-01	5.97566370-02	5.45383040-02			

THETA = 2.25000 13 DENSITIES

DENSITY	1.22335255-01	1.45696744-02	1.63295668-03	2.21673500-04	3.67504530-05	6.75802470-06	1.14955003-06	1.66560050-07
KAPPA(P)	1.37622530+05	9.87256330+04	6.08550350+04	2.22834580+04	5.89721140+03	1.23999910+03	2.60957650+02	6.50013450+01
KAPPA(R)	6.46706060+04	4.45064710+04	2.56103000+04	9.88776010+03	2.61639570+03	5.77751560+02	1.26164667+02	2.57296740+01
DENSITY	2.12478340-03	2.55692660-09	2.84223600-10	2.80453020-11	2.35870140-12			
KAPPA(P)	1.31537774+01	1.87229169+00	2.96708760-01	9.30664990-02	7.26406920-02			
KAPPA(R)	4.42088090+00	6.54483960-01	1.44193370-01	7.52003040-02	7.02163560-02			

THETA = 3.40000 13 DENSITIES

DENSITY	6.45602490-02	1.19221295-02	1.62126313-03	3.01880300-04	5.00730860-05	8.36821480-06	1.38458524-06	2.15984348-07
KAPPA(P)	1.35970020+05	7.60373490+04	3.86727270+04	1.79643390+04	5.88136940+03	1.73858870+03	3.36949800+02	5.62568500+01
KAPPA(R)	1.13954454+05	6.96041920+04	3.13920480+04	1.11107005+04	3.03993040+03	6.84550900+02	1.25344999+02	2.32482520+01
DENSITY	2.97871290-08	3.49756030-09	3.95440880-10	4.04732490-11	3.47307790-12			
KAPPA(P)	9.54596960+00	1.47636486+00	2.50403930-01	9.96783270-02	8.89530130-02			
KAPPA(R)	3.91136720+00	6.18517560-01	1.51934150-01	8.94363570-02	8.69506990-02			

THETA = 5.00000 13 DENSITIES

DENSITY	8.53956960-02	1.47373829-02	2.32112330-03	3.74702580-04	6.45283480-05	1.13270150-05	1.80374990-06	2.97646290-07
KAPPA(P)	1.08360616+05	6.35981660+04	3.54004530+04	1.79687950+04	5.11410090+03	1.14028210+03	2.18815070+02	3.69905960+01
KAPPA(R)	9.38037340+04	5.43978500+04	2.47764570+04	9.53229590+03	2.62134540+03	5.59604890+02	1.01448464+02	1.78353220+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	4.27062730-08	5.12466770-09	5.79659660-10	5.73688370-11	5.10000390-12
KAPPA(P)	6.41133260+00	1.03158520+00	2.14595590-01	1.15531952-01	1.06582280-01
KAPPA(R)	2.75326920+00	4.57738820-01	1.47840250-01	1.07031401-01	1.04613046-01

THETA = 7.00000 13 DENSITIES

DENSITY	1.03345080-01	1.77948180-02	2.91023340-03	4.85673500-04	8.42024180-05	1.53422530-05	2.58080300-06	4.10844930-07
KAPPA(P)	9.16397090+04	5.48699860+04	3.48925960+04	1.48229353+04	3.74361110+03	7.89335120+02	1.51498830+02	2.79099060+01
KAPPA(R)	7.35492050+04	4.63737990+04	2.46859600+04	8.32180090+03	1.78027120+03	3.66863160+02	6.88101980+01	1.26479731+01

DENSITY	5.89091170-08	7.16555770-09	7.88097110-10	7.73082980-11	7.08791530-12
KAPPA(P)	6.16067260+00	9.60961600-01	2.14394820-01	1.34519940-01	1.26035590-01
KAPPA(R)	2.05275210+00	3.69227420-01	1.56532440-01	1.28115940-01	1.23961777-01

THETA = 10.00000 13 DENSITIES

DENSITY	1.35570020-01	2.33092730-02	3.91254980-03	6.66331020-04	1.18177008-04	2.16492460-05	3.66240720-06	5.74308050-07
KAPPA(P)	7.77248200+04	4.85213890+04	2.86996430+04	1.14496104+04	2.69229410+03	5.67000380+02	1.11654570+02	2.11763920+01
KAPPA(R)	5.44201020+04	3.84141010+04	1.79915580+04	5.46169210+03	1.18307110+03	2.30285670+02	4.91428810+01	8.80727410+00

DENSITY	8.16519740-08	1.02331848-08	1.17372915-09	1.22726850-10	1.13112872-11
KAPPA(P)	3.72469540+00	6.35824810-01	1.92419230-01	1.37355480-01	1.34177600-01
KAPPA(R)	1.39357731+00	2.99947750-01	1.55227110-01	1.32997760-01	1.32429080-01

THETA = 15.00000 13 DENSITIES

DENSITY	1.85910070-01	3.29581730-02	5.66572190-03	9.82044440-04	1.74266820-04	3.18383210-05	5.51504920-06	9.07983160-07
KAPPA(P)	5.92416060+04	3.95926940+04	2.24999850+04	7.62302810+03	1.78530210+03	3.54942900+02	6.17489490+01	1.00315580+01
KAPPA(R)	3.77458150+04	2.86228290+04	1.41776627+04	4.19776770+03	9.47173170+02	1.65852190+02	2.62956870+01	4.16594858+00

DENSITY	1.30476030-07	1.73509280-08	1.99460460-09	2.07371340-10	1.89892180-11
KAPPA(P)	1.63574003+00	3.42446440-01	1.65241700-01	1.45709840-01	1.46504810-01
KAPPA(R)	7.75452230-01	2.34267880-01	1.55535850-01	1.43915780-01	1.44468320-01

THETA = 22.49999 13 DENSITIES

DENSITY	2.71446120-01	4.80613480-02	8.37752330-03	1.46822658-03	2.71487910-04	5.20833160-05	9.24652470-06	1.53779654-06
KAPPA(P)	4.35760980+04	3.03338620+04	1.42851093+04	4.34336590+03	8.67107480+02	1.45174850+02	2.53270390+01	4.54379690+00
KAPPA(R)	2.62300230+04	2.06850390+04	1.01731976+04	2.73377570+03	4.47310480+02	7.72246690+01	1.38339535+01	2.20102550+00

DENSITY	2.29771630-07	2.89571180-08	3.31009160-09	3.41371450-10	3.12960310-11
KAPPA(P)	8.77336040-01	2.59862660-01	1.69273760-01	1.60595420-01	1.63093760-01
KAPPA(R)	4.71636080-01	2.10597830-01	1.63369460-01	1.58016620-01	1.60726520-01

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA = 39.99998   13 DENSITIES

DENSITY	4.12249090-01	7.34290960-02	1.31817500-02	2.41520770-03	4.59270140-04	8.84287870-05	1.56999900-05	2.50310100-06
KAPPA(P)	2.70630060+04	1.64321800+04	6.21733080+03	1.59894210+03	3.30976350+02	7.06444780+01	1.54402539+01	3.37712910+00
KAPPA(R)	1.43993440+04	1.02413420+04	4.49976720+03	1.11990250+03	2.11300010+02	3.74480630+01	6.65502350+00	1.36630050+00
DENSITY	3.85297550-07	4.88051540-08	5.55487460-09	5.65755110-10	5.17876270-11			
KAPPA(P)	6.85200010-01	2.38773230-01	1.80743990-01	1.79148530-01	1.82929760-01			
KAPPA(R)	3.66021610-01	1.98007570-01	1.73174070-01	1.76061830-01	1.80401920-01			

THETA = 50.00000   13 DENSITIES

DENSITY	6.56338040-01	1.13680649-01	2.18037340-02	4.07427290-03	7.79101700-04	1.50074170-04	2.65317100-05	4.31102220-06
KAPPA(P)	1.42354523+04	6.78707180+03	2.79957790+03	7.47250100+02	1.81425300+02	4.51977350+01	9.32443120+00	2.00540370+00
KAPPA(R)	7.01328040+03	4.22490030+03	1.97611080+03	4.76729360+02	1.04914417+02	2.25295100+01	4.03261080+00	8.23950020-01
DENSITY	6.39358830-07	7.98964200-08	9.15203120-09	9.65920260-10	9.05136900-11			
KAPPA(P)	5.20777440-01	2.36971360-01	1.92947720-01	1.86552420-01	1.86540100-01			
KAPPA(R)	2.58293270-01	2.00381740-01	1.86987590-01	1.83751130-01	1.83963110-01			

THETA = 69.99998   13 DENSITIES

DENSITY	9.83051260-01	1.80109010-01	3.33443810-02	6.26994950-03	1.18121820-03	2.24401430-04	3.95687890-05	6.50018490-06
KAPPA(P)	8.65504610+03	4.33158550+03	1.68405360+03	5.08054620+02	1.23972152+02	2.91449300+01	6.55547780+00	1.44005933+00
KAPPA(R)	4.62627510+03	2.83193630+03	1.23979820+03	3.36092000+02	6.53009760+01	1.15535527+01	2.21884630+00	5.60803210-01
DENSITY	9.65319400-07	1.27227380-07	1.48777379-08	1.56932543-09	1.46685530-10			
KAPPA(P)	3.92159510-01	2.14671570-01	1.91299500-01	1.89691350-01	1.90665630-01			
KAPPA(R)	2.59733000-01	1.98834990-01	1.87959260-01	1.87248810-01	1.88036530-01			

THETA = 99.99998   13 DENSITIES

DENSITY	1.55763157+03	2.83662540-01	5.18654720-02	9.61501840-03	1.82335881-03	3.53153420-04	6.39862110-05	1.07866644-05
KAPPA(P)	6.62080010+03	3.38016190+03	1.22594950+03	3.10298580+02	7.36572030+01	1.62057150+01	3.32121930+00	7.42561710-01
KAPPA(R)	3.74240190+03	2.24714980+03	8.82426930+02	1.89818420+02	3.55267510+01	6.16559090+00	1.20570334+00	3.02972040-01
DENSITY	1.64648143-06	2.12481710-07	2.48514430-08	2.61749000-09	2.42961050-10			
KAPPA(P)	2.74523060-01	2.02862060-01	1.93610470-01	1.94041930-01	1.96590570-01			
KAPPA(R)	2.30392250-01	1.99341860-01	1.91348280-01	1.91320550-01	1.93782670-01			

THETA = 149.99995   13 DENSITIES

DENSITY	2.56539140+03	4.67112520-01	8.55448920-02	1.62702660-02	3.18329340-03	6.29263790-04	1.19643908-04	1.93018430-05
KAPPA(P)	4.86563060+03	2.17118840+03	6.45870480+02	1.44851190+02	3.06179670+01	6.91233840+00	1.45590593+00	4.32626200-01
KAPPA(R)	2.42920050+03	1.34511380+03	4.35396860+02	8.65395590+01	1.48120786+01	2.92459790+00	7.72173350-01	3.24002690-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	2.92814950-06	3.75270030-07	4.37462480-08	4.63860170-09	4.36475020-10			
KAPPA(P)	2.39934760-01	2.05721280-01	2.01491510-01	2.01069430-01	2.01025400-01			
KAPPA(R)	2.22550530-01	2.00975750-01	1.98517700-01	1.98204690-01	1.98157720-01			

THETA = 224.99990 13 DENSITIES

DENSITY	4.25547530+00	7.97753150-01	1.48538360-01	2.64864690-02	5.68134670-03	1.11822913-03	2.02622090-04	3.41683770-05
KAPPA(P)	2.64537490+03	6.68034760+02	2.20088100+02	5.65657660+01	1.35543021+01	3.43564260+00	9.16252610-01	3.36362440-01
KAPPA(R)	1.16144650+03	5.49605140+02	1.69967790+02	3.87632240+01	7.91930120+00	1.70470256+00	4.90903500-01	2.03023210-01
DENSITY	5.24513520-06	6.91601940-07	8.01841550-08	8.51957000-09	8.01841680-10			
KAPPA(P)	2.23296900-01	2.03728910-01	2.01247050-01	2.00963690-01	2.00933150-01			
KAPPA(R)	2.12615040-01	2.01176430-01	1.98726060-01	1.98226300-01	1.98161880-01			

THETA = 340.00012 13 DENSITIES

DENSITY	7.33000050+00	1.38681797+00	2.65946000-01	5.17785140-02	1.02038721-02	2.02934940-03	3.72498330-04	8.33062200-05
KAPPA(P)	1.18867400+03	3.80569790+02	1.18977089+02	2.91850310+01	6.73007290+00	1.54971337+00	4.46963470-01	2.42803930-01
KAPPA(R)	5.22276590+02	2.50551120+02	9.08237630+01	1.87365460+01	3.54126850+00	8.38100370-01	3.40563050-01	2.33955020-01
DENSITY	9.73892050-06	1.26603588-06	1.48934340-07	1.58152710-08	1.48482368-09			
KAPPA(P)	2.07284090-01	2.01776420-01	2.01071840-01	2.01101200-01	2.01588650-01			
KAPPA(R)	2.00846570-01	1.99351240-01	1.98339710-01	1.98328200-01	1.98804560-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.24343273+01	2.37230270+00	4.60771140-01	9.07822040-02	1.80833800-02	3.61331750-03	6.64022180-04	1.12828353-04
KAPPA(P)	5.90279140+02	2.25008200+02	5.60926030+01	1.19290130+01	2.58080190+00	6.71929340-01	2.86774520-01	2.10146690-01
KAPPA(R)	2.35457150+02	1.26189906+02	3.54859750+01	7.55095440+00	1.65124092+00	5.17047050-01	2.69822490-01	2.12215920-01
DENSITY	1.73275980-05	2.24575230-06	2.63492760-07	2.79717760-08	2.63234710-09			
KAPPA(P)	2.04264420-01	2.02699640-01	2.02873630-01	2.02989300-01	2.03005540-01			
KAPPA(R)	2.00362530-01	1.99512770-01	1.99783500-01	1.99915800-01	1.99929190-01			

THETA = 699.99976 13 DENSITIES

DENSITY	1.90149050+01	3.85288800+00	7.55855080-01	1.49943310-01	2.99207520-02	5.97370400-03	1.09509046-03	1.85648600-04
KAPPA(P)	3.25303020+02	9.90352620+01	2.18877460+01	4.69078940+00	1.12740269+00	4.15565720-01	2.52563650-01	2.13000200-01
KAPPA(R)	9.30958330+01	4.03256190+01	1.07533465+01	2.51621470+00	7.15876500-01	3.22394540-01	2.26405130-01	2.05320820-01
DENSITY	2.85209970-05	3.70654650-06	4.36045100-07	4.63298310-08	4.36045240-09			
KAPPA(P)	2.04509060-01	2.02993970-01	2.02791880-01	2.02776480-01	2.02775050-01			
KAPPA(R)	2.01217670-01	2.00279580-01	1.99997180-01	1.99974580-01	1.99972980-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 999.99967 13 DENSITIES

DENSITY	3.32154450+01	6.51566960+00	1.28557217+00	2.55170070-01	5.08236240-02	1.01387251-02	1.86185694-03	3.16001800-04
KAPPA(P)	1.35540020+02	3.68643510+01	8.25907820+00	2.14147910+00	7.10699060-01	3.27254870-01	2.25577010-01	2.06335250-01
KAPPA(R)	3.64174410+01	1.29266485+01	3.21580910+00	9.06098810-01	3.87179210-01	2.53599760-01	2.14738340-01	2.03286290-01
DENSITY	4.83812520-05	6.32834680-06	7.44532000-07	7.91065680-08	7.44532220-09			
KAPPA(P)	2.03339960-01	2.03059350-01	2.03020770-01	2.03016300-01	2.03015690-01			
KAPPA(R)	2.00310030-01	1.99986980-01	1.99957180-01	1.99953590-01	1.99953180-01			

THETA = 1499.99930 13 DENSITIES

DENSITY	6.02192420+01	1.18830555+01	2.34794990+00	4.66298120-01	9.30678010-02	1.86045150-02	3.41956480-03	5.81313710-04
KAPPA(P)	6.03638430+01	1.60556520+01	4.34015460+00	1.18402160+00	4.08346710-01	2.30945450-01	2.08557810-01	2.04173530-01
KAPPA(R)	1.81094030+01	6.55853320+00	1.79894790+00	5.98453350-01	3.08679420-01	2.24003190-01	2.03336310-01	2.00489580-01
DENSITY	8.94325[illegible]0-05	1.16261930-05	1.36779592-06	1.45328370-07	1.36779633-08			
KAPPA(P)	2.03499030-01	2.03395830-01	2.03382260-01	2.03380630-01	2.03380430-01			
KAPPA(R)	2.00093400-01	2.00035390-01	2.00027790-01	2.00026980-01	2.00026780-01			

THETA = 2249.99670 13 DENSITIES

DENSITY	1.09659591+02	2.16501410+01	4.29967510+00	8.55600770-01	1.70921480-01	3.41761920-02	6.28206850-03	1.06793971-03
KAPPA(P)	2.80200060+01	6.27057440+00	1.98637782+00	5.41203130-01	2.60958210-01	2.13840090-01	2.05502930-01	2.03980820-01
KAPPA(R)	6.35608730+00	2.80311130+00	8.46869730-01	3.30420230-01	2.23791380-01	2.04209670-01	2.00608700-01	1.99930000-01
DENSITY	1.64298420-04	2.13587320-05	2.51278210-06	2.66983250-07	2.51278260-08			
KAPPA(P)	2.03733600-01	2.03693870-01	2.03688790-01	2.03688170-01	2.03687970-01			
KAPPA(R)	1.99819060-01	1.99802880-01	1.99800680-01	1.99800480-01	1.99800480-01			

1 JIANE/SCAT QTUFF 19 FREQ(.001-1.E6) TEMP(1.-2250.) C1/LMS 11/7/66 MATERL = 1105 NX = 061

GREY ABSORPTION COEFFICIENTS 21 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	1.21860905+00	1.38510380-01	1.07608473-02	7.90100850-04	7.72271900-05	1.04391232-05	1.20359225-06	1.06833979-07
KAPPA(P)	1.90979420+04	1.55466260+04	1.35591645+04	8.81836690+03	3.74912570+03	1.25534030+03	5.92094930+02	1.81244850+02
KAPPA(R)	3.68147420+02	8.29520610+02	7.64129260+02	5.99179350+02	3.19355190+02	1.23745986+02	4.35999480+01	1.51200847+01
DENSITY	1.13420362-08	1.26097081-09	1.38375540-10	1.45129488-11	1.36374047-12			
KAPPA(P)	2.53792260+01	4.10600680+00	5.69762990-01	9.22919830-02	4.05586180-02			
KAPPA(R)	3.52470930+00	6.30539160-01	1.21420323-01	4.89626750-02	3.68510560-02			

THETA = 1.50000 13 DENSITIES

DENSITY	2.66609370-01	3.07710800-02	3.09477840-03	3.31509870-04	3.55507250-05	4.65155050-06	6.99877890-07	1.09334936-07
KAPPA(P)	8.45383600+04	6.41956020+04	5.17251770+04	2.90987320+04	9.85941270+03	2.45116080+03	5.49087600+02	8.61890350+01
KAPPA(R)	9.90661220+03	8.47070460+03	6.55807530+03	4.17231360+03	1.89738310+03	6.13206030+02	1.43559120+02	2.41098610+01
DENSITY	1.64309350-08	2.10790800-09	2.32435170-10	2.00566590-11	1.62809617-12			
KAPPA(P)	1.20053016+01	1.58964812+00	2.69423720-01	9.04628560-02	5.95436880-02			
KAPPA(R)	3.29552530+00	4.65237380-01	1.08836121-01	6.12241850-02	5.63141190-02			

THETA = 2.25000 13 DENSITIES

DENSITY	1.17767621-01	1.40043118-02	1.55275119-03	2.07803230-04	3.42741210-05	6.33240830-06	1.09336556-06	1.60447360-07
KAPPA(P)	1.30243170+05	1.16611127+05	7.25121890+04	2.50244830+04	6.27734230+03	1.26814680+03	2.63893590+02	6.39089840+01
KAPPA(R)	7.01590420+04	4.81911120+04	2.75920300+04	1.02153500+04	2.64820130+03	5.68249160+02	1.26468208+02	2.55122810+01
DENSITY	2.05965980-08	2.48344320-09	2.77980550-10	2.78396450-11	2.33149850-12			
KAPPA(P)	1.31511956+01	1.87441839+00	2.94254560-01	9.31347430-02	7.33472690-02			
KAPPA(R)	4.41469470+00	6.55000360-01	1.45865250-01	7.61393550-02	7.10285060-02			

THETA = 3.40000 13 DENSITIES

DENSITY	8.02671570-02	1.12585475-02	1.71574142-03	2.86084600-04	4.80970380-05	8.[illegible]356250-06	1.34914435-06	2.12152620-07
KAPPA(P)	1.53884660+05	8.35808650+04	4.03787890+04	1.76629040+04	5.75150530+03	1.43768000+03	2.85130220+02	5.12661640+01
KAPPA(R)	1.22583405+05	7.47444230+04	3.28911650+04	1.12129531+04	3.03002150+03	6.85144320+02	1.28514910+02	2.32646240+01
DENSITY	2.94194450-08	3.47035180-09	3.95761280-10	4.07025720-11	3.49321940-12			
KAPPA(P)	6.98580560+00	1.41133274+00	2.39066860-01	9.77973310-02	8.83217480-02			
KAPPA(R)	3.85980240+00	6.09467350-01	1.49495500-01	8.85005970-02	8.64155200-02			

THETA = 5.00000 13 DENSITIES

DENSITY	8.42377620-02	1.40670377-02	2.23562600-03	3.63835040-04	6.32018520-05	1.11751339-05	1.84976869-06	2.97644180-07
KAPPA(P)	1.13070557+05	6.40282650+04	3.52855890+04	1.70069090+04	4.83722690+03	1.07621540+03	2.01473920+02	3.41252640+01
KAPPA(R)	9.43984510+04	5.39455180+04	2.43[illegible]+04	9.29715690+03	2.63512510+03	5.57729450+02	9.80901490+01	1.61490780+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	4.29121900-08	5.15695350-09	5.82798390-10	5.76546740-11	5.12372230-12
KAPPA(P)	5.95266480+00	9.76941550-01	2.08535280-01	1.14477269-01	1.06045920-01
KAPPA(R)	2.62306450+00	4.44542100-01	1.45697310-01	1.06029492-01	1.04020955-01

THETA = 7.00000 13 DENSITIES

DENSITY	1.01566450-01	1.72919180-02	2.84303260-03	4.78939150-04	0.36454200-05	1.53485430-05	2.59215760-06	4.12906900-07
KAPPA(P)	9.15293420+04	5.49522530+04	3.37325900+04	1.44375532+04	3.41530090+03	7.24775510+02	1.42035200+02	2.66932960+01
KAPPA(R)	7.21556510+04	4.63603560+04	2.39436060+04	7.76679580+03	1.60041930+03	3.36003630+02	6.53089400+01	1.20205774+01
DENSITY	5.92025280-08	7.19794680-09	7.90868190-10	7.74096270-11	7.00912040-12			
KAPPA(P)	5.99398010+00	9.42275080-01	2.12240760-01	1.34230790-01	1.26006340-01			
KAPPA(R)	1.93420080+00	3.601905∆0-01	1.55258310-01	1.27789360-01	1.23915790-01			

THETA = 10.00000 13 DENSITIES

DENSITY	1.32705010-01	2.29130880-02	3.87453410-03	6.65302320-04	1.19554110-04	2.17479740-05	3.67763750-06	5.75797390-07
KAPPA(P)	7.63337440+04	4.74092230+04	2.81299440+04	1.08007724+04	2.55549940+03	5.47223850+02	1.09450344+02	2.00063950+01
KAPPA(R)	5.35425060+04	3.69806450+04	1.64288930+04	4.01451160+03	1.05444510+03	2.24266920+02	4.64215110+01	8.55984400+00
DENSITY	8.17167370-08	1.02279675-08	1.17102092-09	1.22287060-10	1.12519463-11			
KAPPA(P)	3.69424030+00	6.34262790-01	1.92890910-01	1.37056500-01	1.34890360-01			
KAPPA(R)	1.37302451+00	2.98973900-01	1.55303560-01	1.33445250-01	1.33127630-01			

THETA = 15.00000 13 DENSITIES

DENSITY	1.84137960-01	3.27728790-02	5.66490610-03	9.84352900-04	1.74544650-04	3.18403600-05	5.59643260-06	9.05037000-07
KAPPA(P)	5.74583700+04	3.84567560+04	2.16752240+04	7.46650200+03	1.76044330+03	3.53771770+02	6.19062130+01	1.01176454+01
KAPPA(R)	3.72586070+04	2.72527560+04	1.27721458+04	3.84940500+03	8.96002050+02	1.61306280+02	2.59893530+01	4.17745830+00
DENSITY	1.33404420-07	1.72355820-05	1.97795970-09	2.05429150-10	1.00403550-11			
KAPPA(P)	1.65544451+00	3.47219890-01	1.67072400-01	1.47156150-01	1.47670030-01			
KAPPA(R)	7.80517760-01	2.35906910-01	1.55919080-01	1.45307220-01	1.45610070-01			

THETA = 22.49999 13 DENSITIES

DENSITY	2.70594040-01	4.79403380-02	8.36476530-03	1.46512010-03	2.70507150-04	5.10014740-05	9.22964520-06	1.52091790-06
KAPPA(P)	4.28456750+04	3.01319070+04	1.44642582+04	4.45620300+03	0.91445230+02	1.40772450+02	2.65031000+01	4.67393140+00
KAPPA(R)	2.67786430+04	2.07246270+04	1.02965656+04	2.72201570+03	4.49047630+02	7.03853450+01	1.40953786+01	2.22506490+00
DENSITY	2.28063510-07	2.87965530-08	3.29193670-09	3.43161700-10	3.12172620-11			
KAPPA(P)	8.89143090-01	2.61035990-01	1.70169030-01	1.61139790-01	1.63503400-01			
KAPPA(R)	4.70958920-01	2.11609860-01	1.64469190-01	1.58622200-01	1.61130030-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 35.99998 13 DENSITIES

DENSITY	4.10550560-01	7.31026250-02	1.31100913-02	2.39828600-03	4.55897300-04	8.78759850-05	1.56177890-05	2.57261750-06
KAPPA(P)	2.77216990+04	1.67130460+04	6.35526360+03	1.65949720+03	3.41521960+02	7.20767800+01	1.54512049+01	3.40295780+00
KAPPA(R)	1.42429757+04	1.03524443+04	4.59113420+03	1.14936730+03	2.16910740+02	3.91392950+01	6.73102190+00	1.37456345+00
DENSITY	3.84247420-07	4.66686910-08	5.53840120-09	5.64105420-10	5.16392060-11			
KAPPA(P)	6.51976420-01	2.39604960-01	1.81184020-01	1.79660730-01	1.83455160-01			
KAPPA(R)	3.70023410-01	1.99124380-01	1.73812520-01	1.76569900-01	1.80918070-01			

THETA = 50.00000 13 DENSITIES

DENSITY	6.29716710-01	1.16219574-01	2.12499660-02	3.97237950-03	7.59021860-04	1.46229690-04	2.58280370-05	4.18556060-06
KAPPA(P)	1.47167663+04	7.03494360+03	2.97136460+03	9.35561530+02	1.88883220+02	4.22161550+01	9.05441930+00	2.08442070+00
KAPPA(R)	6.67774710+03	4.37513430+03	2.11456410+03	5.35281060+02	1.06603775+02	2.06606300+01	3.80483630+00	7.84736170-01
DENSITY	6.16413760-07	7.71319200-08	8.81659650-09	9.29466960-10	8.72180480-11			
KAPPA(P)	3.33701170-01	2.43447050-01	2.00167450-01	1.93841000-01	1.93589750-01			
KAPPA(R)	2.86173050-01	2.05157560-01	1.93693740-01	1.90889220-01	1.90911940-01			

THETA = 69.99998 13 DENSITIES

DENSITY	9.52563770-01	1.75212610-01	3.25215930-02	6.10164430-03	1.14758335-03	2.17442520-04	3.82368860-05	6.26833420-06
KAPPA(P)	9.14090773+03	4.75833920+03	1.66425160+03	5.03300770+02	1.22036109+02	2.93273640+01	6.82641730+00	1.50842142+00
KAPPA(R)	4.54635450+03	3.04432310+03	1.33265290+03	3.09316490+02	5.37546940+01	1.00732758+01	2.05910450+00	5.50227580-01
DENSITY	9.49661743-07	1.22830550-07	1.44221606-08	1.53100733-09	1.43998270-10			
KAPPA(P)	4.09441760-01	2.22065480-01	1.97245130-01	1.94417570-01	1.94220730-01			
KAPPA(R)	2.64116300-01	2.04815440-01	1.93739350-01	1.91939320-01	1.91549880-01			

THETA = 99.99999 13 DENSITIES

DENSITY	1.49721365+00	2.76332349-01	5.03505360-02	9.30932220-03	1.76172825-03	3.41006170-04	6.18721780-05	1.04732105-05
KAPPA(P)	6.96233590+03	3.59772480+03	1.22343640+03	3.03648960+02	7.27699400+01	1.64420810+01	3.28793590+00	7.25407870-01
KAPPA(R)	3.72541270+03	2.26870930+03	3.40204590+02	1.66541230+02	3.02507500+01	5.69129590+00	1.17403589+00	3.79938110-01
DENSITY	1.50969072-06	2.08929290-07	2.45392980-08	2.58828600-09	2.39686380-10			
KAPPA(P)	2.74341060-01	2.04724310-01	1.95977560-01	1.96207400-01	1.99274300-01			
KAPPA(R)	2.33647079-01	2.02394020-01	1.93835970-01	1.93481570-01	1.96427870-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.48903430+00	4.52381670-01	8.20145090-02	1.57605700-02	3.09438530-03	6.15293610-04	1.12751644-04	1.90439810-05
KAPPA(P)	5.23207640+03	2.30037770+03	6.41022110+02	1.36096870+02	2.85226350+01	5.85675670+00	1.25738313+00	3.95045260-01
KAPPA(R)	2.46864350+03	1.36242150+03	4.19426780+02	7.89891060+01	1.46425107+01	2.84747310+00	7.21255020-01	3.22432970-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 149.99995 CONTINUED

DENSITY	2.80807040-06	3.69210120-07	4.29499690-08	4.55213270-09	4.28307430-10
KAPPA(P)	2.383[illegible]-01	2.09082160-01	2.05225680-01	2.04891230-01	2.04859270-01
KAPPA(R)	2.25099240-01	2.04232750-01	2.02002540-01	2.01937500-01	2.01934270-01

THETA = 224.99990 13 DENSITIES

DENSITY	4.13031200+00	7.66180800-01	1.44782590-01	2.83168850-02	5.59138090-03	1.10116121-03	1.99222360-04	3.35460350-05
KAPPA(P)	2.75940750+03	6.86921520+02	2.06041160+02	4.65279850+01	1.14206139+01	3.14944730+00	9.03193910-01	3.39304280-01
KAPPA(R)	1.05659420+03	4.76940110+02	1.37555700+02	3.11778200+01	6.74596800+00	1.57580962+00	4.85896080-01	2.59154460-01
DENSITY	5.14734260-06	6.68013910-07	7.66545910-08	8.34744950-09	7.84511570-10			
KAPPA(P)	2.25801440-01	2.07528620-01	2.05169050-01	2.05108740-01	2.05371860-01			
KAPPA(R)	2.12449280-01	2.04292800-01	2.02583120-01	2.02317100-01	2.02539770-01			

THETA = 340.00012 13 DENSITIES

DENSITY	7.15805050+00	1.35443145+00	2.61357520-01	5.09003240-02	1.00212243-02	1.99167150-03	3.65417890-04	6.20467790-05
KAPPA(P)	1.22111900+03	3.55387930+02	1.02320286+02	2.74677050+01	6.62467290+00	1.56762979+00	4.56342020-01	2.40230080-01
KAPPA(R)	4.92553930+02	1.90011570+02	5.49035480+01	1.26927247+01	2.61316520+00	7.00817690-01	3.14234730-01	2.32785930-01
DENSITY	9.53254020-06	1.23790529-06	1.45593110-07	1.54680390-08	1.45540766-09			
KAPPA(P)	2.12262190-01	2.06480560-01	2.05700920-01	2.05617220-01	2.05663070-01			
KAPPA(R)	2.10511070-01	2.04015360-01	2.02928010-01	2.02787420-01	2.02823730-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.24974627+01	2.33022160+00	4.52399880-01	8.90693490-02	1.77260140-02	3.53748600-03	6.49447230-04	1.10351590-04
KAPPA(P)	6.04094700+02	2.08378880+02	5.45903970+01	1.21910852+01	2.72307290+00	7.37367400-01	3.11508700-01	2.25351020-01
KAPPA(R)	2.57521910+02	1.18304635+02	2.95500070+01	5.79485800+00	1.32915538+00	4.09817069-01	2.82555010-01	2.21338290-01
DENSITY	1.69722050-05	2.20544790-06	2.59375250-07	2.75558790-08	2.59346790-09			
KAPPA(P)	2.08782960-01	2.06323490-01	2.06071720-01	2.06051320-01	2.06049460-01			
KAPPA(R)	2.06096000-01	2.03301530-01	2.02966770-01	2.02930850-01	2.02926580-01			

THETA = 699.99976 13 DENSITIES

DENSITY	1.94449420+01	3.78134580+00	7.41135800-01	1.46818810-01	2.92768840-02	5.84953590-03	1.07468682-03	1.82622570-04
KAPPA(P)	3.37862690+02	9.85435880+01	2.26853870+01	5.10286410+00	1.23057210+00	4.10064140-01	2.46529090-01	2.13083320-01
KAPPA(R)	1.14152468+02	5.27262790+01	1.45981415+01	3.27722810+00	8.61261240-01	3.61867550-01	2.39677740-01	2.10289950-01
DENSITY	2.80907060-05	3.65169190-06	4.29604890-07	4.56455380-08	4.29604960-09			
KAPPA(P)	2.06878610-01	2.05940700-01	2.05825810-01	2.05812440-01	2.05811000-01			
KAPPA(R)	2.04152090-01	2.03103620-01	2.02976510-01	2.02962300-01	2.02960680-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 999.99967 13 DENSITIES

DENSITY	3.25683270+01	6.34550130+00	1.25909623+00	2.50091600-01	4.99241710-02	9.97858480-03	1.83394296-03	3.11757800-04
KAPPA(P)	1.41205740+02	3.79549900+01	8.64674530+00	2.00372290+00	5.87362320-01	2.88477840-01	2.22237960-01	2.08539030-01
KAPPA(R)	3.60157080+01	1.69903410-01	5.40603000+00	1.40241366+00	4.70211350-01	2.65910890-01	2.15806310-01	2.04850670-01
DENSITY	4.79523250-05	6.23507480-06	7.33542760-07	7.79399610-08	7.33542990-09			
KAPPA(P)	2.06354440-01	2.06060160-01	2.06021440-01	2.06016700-01	2.06016290-01			
KAPPA(R)	2.03095000-01	2.02870190-01	2.02838740-01	2.02835080-01	2.02834680-01			

THETA = 1499.99930 13 DENSITIES

DENSITY	5.90481920+01	1.16551946+01	2.30671640+00	4.58908880-01	9.16695510-02	1.83289040-02	3.36905160-03	5.72731240-04
KAPPA(P)	5.94361760+01	1.40312217+01	3.36435740+00	8.59692960-01	3.34856570-01	2.31839950-01	2.11419700-01	2.07059930-01
KAPPA(R)	9.70547330+00	4.31681550+00	1.54766054+00	5.21303850-01	2.69275300-01	2.16380900-01	2.05264680-01	2.02908930-01
DENSITY	8.81123390-05	1.14545914-05	1.34759370-06	1.43181910-07	1.34759394-08			
KAPPA(P)	2.06234570-01	2.06126540-01	2.06112940-01	2.06111290-01	2.06111080-01			
KAPPA(R)	2.02445010-01	2.02383480-01	2.02375980-01	2.02374970-01	2.02374970-01			

THETA = 2249.99870 13 DENSITIES

DENSITY	1.07733062+02	2.12884340+01	4.22371040+00	8.42826550-01	1.68396660-01	3.36718880-02	6.18932650-03	1.05217376-03
KAPPA(P)	2.41623280+01	5.95011760+00	1.39931412+00	4.30218440-01	2.51193170-01	2.14533150-01	2.07214240-01	2.05833400-01
KAPPA(R)	2.32989360+00	9.45741600-01	4.14630630-01	2.60536060-01	2.16663240-01	2.04571440-01	2.01732040-01	2.01158720-01
DENSITY	1.61372390-04	2.10434760-05	2.47569370-06	2.63042560-07	2.47569410-08			
KAPPA(P)	2.05594000-01	2.05556770-01	2.05551840-01	2.05551220-01	2.05551220-01			
KAPPA(R)	[illegible]	[illegible]	2.01040880-01	2.01040480-01	2.01040480-01			

35 DIANE/SCAT REF-1A TEMP(1.5-225N.)EV. SADY INPUT TAPES(1819,1818) 11-8-67 MATERL = 1104 NK = 888

GREY ABSORPTION COEFFICIENTS 19 TEMPERATURES

THETA = 1.50000 10 DENSITIES

DENSITY	2.55573660-01	2.89381880-02	2.76381870-03	2.88180770-04	3.28775680-05	4.52474220-06	6.89175480-07	1.00112092-07
KAPPA(P)	9.39468620+04	7.45763790+04	5.49340420+04	3.39296350+04	1.05145251+04	2.53081060+03	5.26541390+02	8.99006310+01
KAPPA(R)	7.53117210+03	6.67340460+03	5.66200240+03	3.96047350+03	2.03626990+03	7.12473690+02	1.67609350+02	2.91456880+01

DENSITY	1.58412270-08	1.86793940-09
KAPPA(P)	1.44463239+01	2.46462190+00
KAPPA(R)	4.70717990+00	9.74770940-01

THETA = 2.25000 10 DENSITIES

DENSITY	1.10200462-01	1.29823312-02	1.47059528-03	2.01019030-04	3.34242140-05	6.03846940-06	9.93390150-07	1.42704470-07
KAPPA(P)	1.72765090+05	1.22609539+05	7.49719970+04	2.68301060+04	6.88877050+03	1.57643300+03	3.58050170+02	8.03122330+01
KAPPA(R)	6.61222090+04	4.77598190+04	2.69509960+04	1.18700414+04	3.28069960+03	7.98182260+02	1.66121420+02	3.26072930+01

DENSITY	1.91213560-08	2.33699500-09
KAPPA(P)	1.51099577+01	2.29126750+00
KAPPA(R)	5.42096070+00	9.61639490-01

THETA = 3.40000 10 DENSITIES

DENSITY	7.73629730-02	1.03481147-02	1.64050696-03	2.64196680-04	4.39297010-05	7.51507190-06	1.24747391-06	1.90767590-07
KAPPA(P)	1.67426210+05	9.46536630+04	5.15645650+04	2.35266700+04	7.34416140+03	1.72933900+03	3.36209320+02	6.53996530+01
KAPPA(R)	1.31607080+05	8.06699960+04	3.85306740+04	1.35641001+04	3.55816040+03	7.69920270+02	1.45896430+02	2.76647400+01

DENSITY	2.64338060-08	3.15313110-09
KAPPA(P)	1.17257465+01	1.90467589+00
KAPPA(R)	4.82691710+00	8.63817930-01

THETA = 5.00000 10 DENSITIES

DENSITY	8.00467400-02	1.31684823-02	2.96774010-03	3.36276130-04	5.76320370-05	1.01066195-05	1.67367306-06	2.63727300-07
KAPPA(P)	1.31281610+05	7.78103600+04	4.58110180+04	2.17696670+04	6.47144030+03	1.38780410+03	2.63643530+02	4.57798000+01
KAPPA(R)	1.08564219+05	6.79569670+04	3.08715390+04	1.20169432+04	3.10220360+03	6.11864580+02	1.16812251+02	2.02843970+01

DENSITY	3.79016970-08	4.64808840-09
KAPPA(P)	7.83843040+00	1.27267181+00
KAPPA(R)	3.36993010+00	6.48547070-01

THETA = 7.00000 10 DENSITIES

DENSITY	9.51103960-02	1.59438570-02	2.61166330-03	4.38635860-04	7.60109630-05	1.37415023-05	2.32979580-06	3.76548110-07
KAPPA(P)	1.12762394+05	7.05036640+04	4.32996560+04	1.74111490+04	4.24346720+03	8.84246590+02	1.70099740+02	2.97076820+01
KAPPA(R)	8.34564220+04	5.98358330+04	3.11973970+04	9.71939740+03	2.09604170+03	4.37129720+02	7.76105190+01	1.34756005+01

GHET ABSORPTION COEFFICIENTS CONTINUED

THETA = 7.00000 CONTINUED

DENSITY	5.51146770-08	6.83459710-09
KAPPA(P)	5.96226930+00	9.91113620-01
KAPPA(R)	2.30950720+00	5.07406610-01

THETA = 10.00000 10 DENSITIES

DENSITY	1.22749017-01	2.09450910-02	3.53943340-03	6.11421510-04	1.08854112-04	2.01570000-05	3.47025450-06	5.56532600-07
KAPPA(P)	9.20619700+04	5.91954460+04	3.45699460+04	1.16686256+04	2.64110310+03	5.42904260+02	1.02931627+02	1.94390120+01
KAPPA(R)	5.50677000+04	4.51610340+04	2.39593140+04	6.05175350+03	1.32267560+03	2.74032010+02	5.16829520+01	8.97533230+00

DENSITY	8.08235020-08	1.01665257-08
KAPPA(P)	3.40373070+00	6.50698620-01
KAPPA(R)	1.49351900+00	3.93192720-01

THETA = 15.00000 10 DENSITIES

DENSITY	1.71073000-01	3.02593400-02	5.23686100-03	9.32469650-04	1.69602170-04	3.14038520-05	5.49133050-06	9.00319200-07
KAPPA(P)	8.55062930+04	4.09226900+04	2.05521100+04	6.28497900+03	1.46844000+03	2.99734760+02	5.23032220+01	8.59892320+00
KAPPA(R)	3.42759740+04	2.81527390+04	1.46590532+04	4.14191270+03	8.76403560+02	1.57700200+02	2.52154770+01	4.10621620+00

DENSITY	1.36951070-07	1.74570900-08
KAPPA(P)	1.51422263+00	3.90052510-01
KAPPA(R)	8.63642560-01	3.12065560-01

THETA = 22.49999 10 DENSITIES

DENSITY	2.50655040-01	4.55990640-02	8.07933270-03	1.45784354-03	2.73748440-04	5.25295900-05	9.36622980-06	1.54745340-06
KAPPA(P)	4.23563010+04	2.65920210+04	1.10281784+04	2.95199040+03	5.82275640+02	1.15165701+02	2.22239150+01	4.23629460+00
KAPPA(R)	2.31563030+04	1.79429850+04	8.68410010+03	2.30443290+03	3.94904270+02	6.73275140+01	1.30794320+01	2.32737160+00

DENSITY	2.28800620-07	2.84192250-08
KAPPA(P)	9.56704460-01	3.31352010-01
KAPPA(R)	5.75240250-01	2.73759030-01

THETA = 33.99998 6 DENSITIES

DENSITY	4.00630400-01	7.19622200-02	1.30041597-02	2.44322350-03	4.63335120-04	8.00016570-05
KAPPA(P)	2.59505990+04	1.41003793+04	5.16567940+03	1.21991190+03	2.84332950+02	6.76069840+01
KAPPA(R)	1.43112456+04	9.14221440+03	3.66493080+03	8.37968900+02	1.60718910+02	3.23828820+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 50.00000 6 DENSITIES

DENSITY	5.25005770-01	1.15045909-01	2.10313950-02	3.99716980-03	7.35396350-04	1.39403220-04
KAPPA(P)	1.60331655+04	7.85550570+03	2.93244240+03	7.47349670+02	1.96726400+02	4.93470990+01
KAPPA(R)	9.87895430+03	5.31613579+03	1.84233340+03	3.71285360+02	8.50663000+01	1.78399370+01

THETA = 69.99998 8 DENSITIES

DENSITY	9.41921253-01	1.71647040-01	9.42372650-01	1.71647040-01	3.14898510-02	5.86485220-03	1.10237205-03	2.10431160-04
KAPPA(P)	1.12334252+04	5.54503890+03	1.12424378+04	5.54508890+03	2.03233560+03	5.07152610+02	1.24422615+02	2.06831540+01
KAPPA(R)	7.20091920+03	3.82681410+03	7.20581730+03	3.82681410+03	1.28074720+03	2.51228020+02	4.56582810+01	8.25947400+00

THETA = 99.99998 6 DENSITIES

DENSITY	1.45311086+00	2.66020480-01	4.85045980-02	9.07775850-03	1.73467540-03	3.38225750-04
KAPPA(P)	8.29144660+03	3.72990440+03	1.19980100+03	2.92209480+02	6.60140070+01	1.44307591+01
KAPPA(R)	5.10505200+03	2.75961920+03	8.55176390+02	1.66217960+02	2.67248800+01	4.81952790+00

THETA = 149.99995 6 DENSITIES

DENSITY	2.41555000+00	4.39019330-01	8.17255180-02	1.56998160-02	3.09241180-03	6.15056780-04
KAPPA(P)	5.30955170+03	2.16105740+03	5.65213170+02	1.19335269+02	2.33511670+01	4.72830120+00
KAPPA(R)	2.40341020+03	1.32765420+03	4.11992420+02	5.07568620+01	1.39698436+01	2.75671840+00

THETA = 224.99990 6 DENSITIES

DENSITY	4.04124570+00	7.52623190-01	1.44410540-01	2.83964920-02	5.60845510-03	1.10514913-03
KAPPA(P)	2.55600040+03	6.29176460+02	1.55267910+02	3.83868500+01	9.37077660+00	2.67084340+00
KAPPA(R)	8.50766300+02	3.88684500+02	1.09540566+02	2.30759730+01	4.94337340+00	1.21543835+00

THETA = 340.00012 6 DENSITIES

DENSITY	7.03257550+00	1.34833729+00	2.62309280-01	5.12064400-02	1.00915585-02	2.00396810-03
KAPPA(P)	1.05741550+03	2.97223960+02	8.30023530+01	2.32028700+01	5.71743330+00	1.43152511+00
KAPPA(R)	3.92061990+02	1.39339720+02	3.71714870+01	7.94790190+00	1.70293901+00	5.49663610-01

THETA = 499.99993 6 DENSITIES

DENSITY	1.20989084+01	2.32996230+00	4.54980740-01	8.98303860-02	1.78702670-02	3.56679100-03
KAPPA(P)	5.24704550+02	1.74823860+02	4.39692250+01	9.80541700+00	2.15437640+00	5.96505150-01
KAPPA(R)	2.06673650+02	9.07868940+01	2.13972620+01	3.94982380+00	9.70266830-01	4.02709360-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 699.99975 4 DENSITIES

DENSITY	1.94078750+01	3.79240350+00	7.45950090-01	1.48296740-01
KAPPA(P)	2.90265570+02	6.32112830+01	1.75661710+01	3.96467930+00
KAPPA(R)	7.77745250+02	3.18026340+01	7.62874980+00	1.77053630+00

THETA = 999.99967 4 DENSITIES

DENSITY	3.26097060+01	6.42113550+00	1.26887322+00	2.52786000-01
KAPPA(P)	1.35339710+02	3.41448570+01	7.24907580+00	1.55363646+00
KAPPA(R)	1.81221010+01	5.88055110+00	1.50709158+00	4.77962070-01

THETA = 2249.99070 4 DENSITIES

DENSITY	1.08515018+02	2.14360690+01	4.26260720+00	8.51939300-01
KAPPA(P)	1.54690056+01	3.55345360+00	8.40092910-01	3.01951760-01
KAPPA(R)	9.15612010-01	3.81431270-01	2.43605540-01	2.07142980-01

30 JIANE/SCAT SEA WATER-1A TEMP(1.-1.E4 EV) 1 FREQ. CI/JM 10-9-67 MATERL = 1130 NX = 904

GREY ABSORPTION COEFFICIENTS 24 TEMPERATURES

THETA = 1.50000 13 DENSITIES

DENSITY	2.87789200-01	3.95744730-02	3.71357240-03	2.58594010-04	1.93929700-05	2.25739290-06	3.47924630-07	5.69176730-08
KAPPA(P)	5.20466670+05	3.70771010+05	3.17660950+05	1.63912820+05	4.11821400+04	7.52110920+03	1.26034520+03	1.73873490+02
KAPPA(R)	6.69335240+03	4.55394850+03	3.53294450+03	2.60443480+03	1.43226300+03	4.09942520+02	6.87674130+01	9.52971650+00
DENSITY	8.69219660-09	1.12477816-09	1.28793600-10	1.21264766-11	1.02156028-12			
KAPPA(P)	2.40222610+01	3.07999190+00	4.43494750-01	1.40718050-01	9.47818840-02			
KAPPA(R)	1.31815511+00	2.68636260-01	1.14227411-01	9.07933700-02	8.86698810-02			

THETA = 2.25000 13 DENSITIES

DENSITY	9.38006760-02	9.13465400-03	8.53926040-04	1.05010844-04	1.75611770-05	3.34183680-06	5.95389540-07	9.33108190-08
KAPPA(P)	1.04564027+06	7.07476650+05	4.32012580+05	1.13241726+05	1.58438697+04	2.42598270+03	4.31394930+02	8.80125110+01
KAPPA(R)	7.16250540+04	4.95020810+04	2.93040170+04	9.64424780+03	1.82159720+03	3.06799040+02	5.92850950+01	1.64355300+01
DENSITY	1.27365520-08	1.57411932-09	1.82944190-10	1.89611320-11	1.60709968-12			
KAPPA(P)	1.73500920+01	2.44646270+00	3.71573160-01	1.25397200-01	1.06123687-01			
KAPPA(R)	3.87638490+00	6.44494100-01	1.70400620-01	1.03750428-01	1.01824860-01			

THETA = 3.40000 13 DENSITIES

DENSITY	4.72600010-02	6.13795300-03	9.04739040-04	1.54821920-04	2.76977340-05	4.96756900-06	8.61560990-07	1.41560300-07
KAPPA(P)	6.66262950+05	4.43742580+05	2.03483440+05	5.47312420+04	1.10413761+04	2.14931380+03	3.78559010+02	6.31407870+01
KAPPA(R)	3.16201453+05	1.65343430+05	6.37585340+04	1.53353197+04	3.34644850+03	6.51215700+02	1.07236747+02	1.79612550+01
DENSITY	2.01651530-08	2.38752160-09	2.71986130-10	2.79031930-11	2.38815510-12			
KAPPA(P)	1.10328587+01	1.64507769+00	3.30104840-01	1.42066500-01	1.29829790-01			
KAPPA(R)	3.61339340+00	5.92631010-01	1.95347350-01	1.25255450-01	1.25899790-01			

THETA = 5.00000 13 DENSITIES

DENSITY	4.87611260-02	7.91814780-03	1.29993896-03	2.23133140-04	4.09131120-05	7.53659630-06	1.26712509-06	2.04233900-07
KAPPA(P)	5.75042940+05	3.32940790+05	1.73759930+05	4.74617740+04	3.90243370+03	1.72383870+03	3.05739350+02	5.00257050+01
KAPPA(R)	4.54339450+05	2.38433510+05	7.26835190+04	1.51791477+04	2.78177910+03	5.48750540+02	1.01212774+02	1.63174320+01
DENSITY	2.93797360-08	3.52135540-09	3.97009890-10	3.91829260-11	3.47589190-12			
KAPPA(P)	9.34770620+00	1.57245327+00	3.16713090-01	1.70458400-01	1.57092570-01			
KAPPA(R)	2.99000460+00	5.67415940-01	2.03149520-01	1.54907820-01	1.53218690-01			

THETA = 7.00000 13 DENSITIES

DENSITY	6.21838466-02	1.05343177-02	1.79555327-03	3.16854460-04	5.68695790-05	1.05003717-05	1.77125899-06	2.81475650-07
KAPPA(P)	4.20344490+05	2.73292100+05	1.45670120+05	3.97923490+04	7.66269450+03	1.38000300+03	2.44381600+02	4.23279230+01
KAPPA(R)	3.03443270+05	1.82026940+05	5.79234690+04	1.32174458+04	2.28833080+03	4.20135380+02	8.77271970+01	1.56032927+01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA =	7.00000	CONTINUED						
DENSITY	4.02530530-06	4.63933290-09	5.40725160-10	5.41263520-11	5.02116070-12			
KAPPA(P)	7.80106280+00	1.28757322+00	3.13701390-01	1.92015150-01	1.78560820-01			
KAPPA(R)	2.61065060+00	5.04683560-01	2.22577930-01	1.81401950-01	1.74829680-01			
THETA =	10.00000		13 DENSITIES					
DENSITY	3.45067020-02	1.45114254-02	2.35648760-03	4.53981230-04	9.09949310-05	1.48287898-05	2.51212890-06	3.99642850-07
KAPPA(P)	2.99267560+05	2.04979410+05	1.10587236+05	2.95597790+04	5.67835000+03	1.04397830+03	1.80681530+02	3.14202620+01
KAPPA(R)	1.53325750+05	1.11335109+05	4.10029780+04	9.55203850+03	2.00343190+03	3.90491800+02	6.66772600+01	1.13251505+01
DENSITY	5.76105590-08	7.30673070-09	8.55735480-10	9.04128950-11	8.54179520-12			
KAPPA(P)	3.37924420+00	8.75253850-01	2.59164270-01	1.85832220-01	1.78261800-01			
KAPPA(R)	1.77314533+00	3.91806847-01	2.06729900-01	1.78544040-01	1.75128380-01			
THETA =	15.00000		13 DENSITIES					
DENSITY	1.23617024-01	2.15959950-02	3.92355760-03	6.81201110-04	1.22593810-04	2.26797070-05	3.99063600-06	6.69509830-07
KAPPA(P)	1.79562740+05	1.30044241+05	6.29716530+04	1.59238391+04	2.87778440+03	4.81127820+02	7.33614050+01	1.14072939+01
KAPPA(R)	5.79201070+04	5.11737980+04	2.76002460+04	8.36987670+03	1.55245990+03	2.33772630+02	2.99299900+01	4.11267630+00
DENSITY	1.02672569-07	1.33310505-08	1.56607564-09	1.06239790-10	1.56343630-11			
KAPPA(P)	1.80505451+00	3.24952900-01	2.01545320-01	1.80553160-01	1.78394120-01			
KAPPA(R)	7.29579060-01	2.61254220-01	1.92674890-01	1.79342570-01	1.75301480-01			
THETA =	22.49999		13 DENSITIES					
DENSITY	1.87697050-01	3.30969880-02	5.92587460-03	1.07384027-03	2.01947880-04	3.94799560-05	7.20993950-06	1.22267447-06
KAPPA(P)	9.52091060+04	6.53053920+04	2.60234010+04	5.28442920+03	9.37711660+02	1.35492320+02	2.21975290+01	3.65778950+00
KAPPA(R)	1.80604200+04	1.67943180+04	1.03462818+04	3.49356310+03	5.71247720+02	7.14760150+01	9.93137530+00	1.65925563+00
DENSITY	1.87637240-07	2.43942120-08	2.86745810-09	3.04414810-10	2.86221560-11			
KAPPA(P)	6.92129020-01	2.43944630-01	1.95087410-01	1.79420510-01	1.78860340-01			
KAPPA(R)	4.44776460-01	2.29788260-01	1.83906630-01	1.76338820-01	1.75625210-01			
THETA =	33.99996		13 DENSITIES					
DENSITY	2.99141070-04	5.41832210-02	9.90339150-03	1.88557210-03	3.67335130-04	7.27374640-05	1.33283139-05	2.26227830-06
KAPPA(P)	4.16518050+04	2.30714190+04	7.57315420+03	1.32306190+03	2.24924090+02	4.01185560+01	6.85717120+00	1.27281183+00
KAPPA(R)	5.80035250+03	4.50257490+03	2.39275550+03	7.45600530+02	1.54452090+02	2.61789530+01	4.25007650+00	8.59701620-01
DENSITY	3.47326730-07	4.47860200-08	5.07017750-09	5.08565850-10	4.60883980-11			
KAPPA(P)	3.50328000-01	2.08347480-01	1.93601400-01	1.99668650-01	2.06381470-01			
KAPPA(R)	3.01930100-01	1.97808090-01	1.87296380-01	1.95380760-01	2.02532280-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 50.00000 13 DENSITIES

DENSITY	4.70498410-01	6.95330910-02	1.69165810-02	3.22838100-03	6.50053440-04	1.28459350-04	2.30957960-05	3.73553310-06
KAPPA(P)	1.64266270+04	7.29183450+03	2.05410380+03	4.14523040+02	8.30293350+01	1.78927560+01	4.93467580+00	1.62832713+00
KAPPA(R)	2.43572010+03	1.63322840+03	8.28711430+02	2.35066620+02	4.51650690+01	8.12657050+00	1.80226479+00	5.57780470-01
DENSITY	5.47365010-07	6.74135390-08	7.65298580-09	8.07425920-10	7.59276670-11			
KAPPA(P)	3.26462[illegible]0-01	2.76137040-01	2.30701410-01	2.24066590-01	2.23349610-01			
KAPPA(R)	2.75081460-01	2.23490560-01	2.19593460-01	2.19254310-01	2.19229970-01			

THETA = 69.99999 13 DENSITIES

DENSITY	7.44156290-01	1.42571560-01	2.75477330-02	5.32398600-03	1.01959075-03	1.92550140-04	3.35692550-05	5.45569790-06
KAPPA(P)	9.70177[illegible]0+03	3.54944270+03	9.77734820+02	2.56974530+02	7.87912510+01	2.52895680+01	6.75908130+00	1.62254449+00
KAPPA(R)	1.95[illegible]03010+03	1.05550740+03	4.34700790+02	1.06056074+02	1.94677250+01	4.27458060+00	1.15510319+00	4.26626780-01
DENSITY	6.25396180-07	1.06940959-07	1.25701630-08	1.33494597-09	1.25562190-10			
KAPPA(P)	4.50475570-01	2.54114330-01	2.27066810-01	2.23903980-01	2.23670120-01			
KAPPA(R)	2.59[illegible]0-01	2.26139620-01	2.21065440-01	2.20050330-01	2.19652620-01			

THETA = 99.99995 13 DENSITIES

DENSITY	1.22420503+00	2.34470140-01	4.38441530-02	8.19752540-03	1.54203400-03	2.96904220-04	5.38604070-05	9.12611920-06
KAPPA(P)	7.83792[illegible]0+03	3.20[illegible]0+03	1.06867390+03	2.87714570+02	7.68158490+01	1.76844890+01	3.52871920+00	7.94273270-01
KAPPA(R)	2.07230110+03	9.23381960+02	2.90250670+02	6.03426990+01	1.11163498+01	2.23187330+00	6.28653710-01	3.15695230-01
DENSITY	1.40256208-0[illegible]	1.82225670-07	2.14341600-08	2.27733490-09	2.14335200-10			
KAPPA(P)	3.09594470-01	2.35299910-01	2.25039900-01	2.23826970-01	2.23704110-01			
KAPPA(R)	2.47609330-01	2.30440730-01	2.21939380-01	2.19896670-01	2.19639440-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.10691300+00	3.91911190-01	7.24461310-02	1.37496350-02	2.69756180-03	5.36594440-04	9.84885780-05	1.87363100-05
KAPPA(P)	5.47974010+03	2.78933350+03	7.04213800+02	1.44219900+02	2.94636990+01	5.94250040+00	1.27827714+00	4.01248600-01
KAPPA(R)	2.28739220+03	8.84580910+02	2.29121410+02	4.22081770+01	6.28263190+00	1.29056432+00	4.96974730-01	3.10186690-01
DENSITY	[illegible]	[illegible]34693740-07	3.03744020-08	4.18244490-09	3.93384870-10			
KAPPA(P)	[illegible]	2.27[illegible]310-01	2.24110730-01	2.23801230-01	2.23905540-01			
KAPPA(R)	[illegible]	[illegible]	[illegible]	2.1973[illegible]-01	2.198[illegible]-01			

THETA = [illegible] 13 DENSITIES

DENSITY	3.50153990+00	[illegible]0160-01	1.20649500-01	2.47996020-02	4.92780220-03	9.84218180-04	1.80890110-04	3.07358780-05
KAPPA(P)	3.50034970+03	1.08440130+03	2.10783930+02	4.32094430+01	8.62571610+00	1.87444984+00	5.27187840-01	2.75883120-01
KAPPA(R)	9.99445[illegible]+02	4.[illegible]+02	1.00963964+02	1.01813070+01	3.34079230+00	9.20147280-01	4.08788180-01	2.64567280-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99990 CONTINUED

DENSITY	4.72600670-06	6.13963750-07	7.22033090-08	7.67091530-09	7.21946630-10
KAPPA(P)	2.32096[illegible]0-01	2.25147840-01	2.24245690-01	2.24143680-01	2.24136960-01
KAPPA(R)	2.27[illegible]0-01	2.21023550-01	2.20166100-01	2.20062210-01	2.20051210-01

THETA = 340.00012 13 DENSITIES

DENSITY	[illegible].22509650+00	1.15659463+00	2.22353350-01	4.58707330-02	9.14303430-03	1.82622916-03	3.35432110-04	5.70026990-05
KAPPA(P)	1.30[illegible]0+03	3.06623890+02	6.71065300+01	1.41867864+01	3.02966480+00	7.97816060-01	3.33034220-01	2.42973960-01
KAPPA(R)	2.20784[illegible]+02	7.95340310+01	2.25525240+01	5.50809040+00	1.39014741+00	5.02175310-01	2.86207560-01	2.33800050-01

DENSITY	[illegible].75671620-06	1.13990005-06	1.34105380-07	1.42487043-08	1.34105418-09
KAPPA(P)	2.27030[illegible]0-01	2.24511800-01	2.24181560-01	2.24142340-01	2.24138300-01
KAPPA(R)	2.22635[illegible]0-01	2.20417890-01	2.20090370-01	2.20050980-01	2.20046800-01

THETA = 499.99983 13 DENSITIES

DENSITY	1.07356267+01	2.07479630+00	4.13786150-01	8.16479970-02	1.62811870-02	3.25355190-03	5.97927520-04	1.01642380-04
KAPPA(P)	4.46750450+02	1.19474968+02	2.54767660+01	5.50297030+00	1.33576744+00	4.46175440-01	2.64681780-01	2.31318900-01
KAPPA(R)	5.61522940+01	2.66535330+01	7.79761760+00	1.95705264+00	6.40058430-01	3.32262160-01	2.46239160-01	2.24995920-01

DENSITY	1.56371680-05	2.03233340-06	2.39155960-07	2.54103360-08	2.39156040-09
KAPPA(P)	2.25163630-01	2.24134380-01	2.24078460-01	2.24064340-01	2.24062780-01
KAPPA(R)	2.20596[illegible]0-01	2.19938870-01	2.19801590-01	2.19791260-01	2.19790160-01

THETA = 699.99976 13 DENSITIES

DENSITY	1.72491770+01	3.42058900+00	6.79072960-01	1.35116490-01	2.[illegible]9601350-02	5.38897030-03	9.90445260-04	1.69370110-04
KAPPA(P)	2.16180950+02	5.15677070+01	1.14114357+01	2.50292750+00	6.[illegible]8453730-01	3.13884880-01	2.39960250-01	2.26225950-01
KAPPA(R)	2.33355900+01	1.01752059+01	3.29605070+00	9.42951540-01	3.[illegible]0551350-01	2.60941770-01	2.26977360-01	2.19724010-01

DENSITY	2.59030470-05	3.36734510-06	3.96163050-07	4.20923480-08	3.[illegible]6163170-09
KAPPA(P)	2.25[illegible]0-01	2.23459300-01	2.23409470-01	2.23403560-01	2.[illegible]3402990-01
KAPPA(R)	2.16390[illegible]0-01	2.18176920-01	2.18148990-01	2.18145720-01	2.18145280-01

THETA = 999.99967 13 DENSITIES

DENSITY	2.92275050+01	5.82470930+00	1.15929811+00	2.30634290-01	4.60300890-02	9.20135070-03	1.69114917-03	2.87486690-04
KAPPA(P)	5.51622[illegible]0+02	1.31043442+01	3.00317770+00	7.90925880-01	3.38486520-01	2.44286880-01	2.24949350-01	2.21381240-01
KAPPA(R)	5.11005920+00	2.06137130+00	7.16024790-01	3.48024290-01	2.48266380-01	2.21610260-01	2.14965660-01	2.13630150-01

DENSITY	4.44285550-05	5.74971650-06	6.76434670-07	7.18712300-08	6.76434790-09
KAPPA(P)	2.20764030-01	2.20664230-01	2.20653430-01	2.20651890-01	2.20651660-01
KAPPA(R)	2.13392730-01	2.13354970-01	2.13350060-01	2.13349420-01	2.13349420-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1499.99950 13 DENSITIES

DENSITY	5.35[illegible]+01	1.0[illegible]+01	2.12607750+00	4.23646670-01	8.45601660-02	1.69038080-02	3.10683740-03	5.28146960-04
KAPPA(P)	2.501[illegible]+01	5.[illegible]+00	1.34953547+00	4.51626260-01	2.62570670-01	2.24665640-01	2.16827750-01	2.15355960-01
KAPPA(R)	1.4[illegible]+00	5.69112710-01	3.15480350-01	2.42538700-01	2.16975900-01	2.09240280-01	2.07159340-01	2.06731170-01
DENSITY	[illegible].12529[illegible]-05	1.05029234-05	1.24209284-06	1.32036160-07	1.24269303-08			
KAPPA(P)	2.151004[illegible]-01	2.15060050-01	2.15034670-01	2.15054020-01	2.15054020-01			
KAPPA(R)	2.06655[illegible]-01	2.06643130-01	2.06641670-01	2.06641470-01	2.06641470-01			

THETA = 2249.99670 13 DENSITIES

DENSITY	9.82259[illegible]+01	1.96017130+01	3.90591080+00	7.78236770-01	1.55344510-01	3.10542380-02	5.70762090-03	9.70267260-04
KAPPA(P)	1.150742[illegible]+01	2.63055640+00	6.92510770-01	3.03762440-01	2.27061130-01	2.11528820-01	2.08345400-01	2.08147770-01
KAPPA(R)	2.35[illegible]10[illegible]-01	3.1[illegible]39690-01	2.35057370-01	2.12680990-01	2.04228560-01	2.01441950-01	2.00733920-01	2.00823870-01
DENSITY	1.64271[illegible]0-04	1.94051900-05	2.28297770-06	2.42566490-07	2.28297840-08			
KAPPA(P)	2.08044[illegible]-01	2.08027710-01	2.08025630-01	2.08025210-01	2.08025210-01			
KAPPA(R)	2.00799[illegible]-01	2.00795160-01	2.00794560-01	2.00794560-01	2.00794560-01			

THETA = 3400.00[illegible] 13 DENSITIES

DENSITY	1.82251930+02	3.61434530+01	7.22549680+00	1.44554901+00	2.88560350-01	5.76952360-02	1.06022821-02	1.80233721-03
KAPPA(P)	5.19737[illegible]0+00	1.21747907+00	3.46183550-01	2.34296640-01	2.08056620-01	2.02001940-01	2.01628570-01	2.01395430-01
KAPPA(R)	5.70846[illegible]-01	2.44[illegible]9970-01	2.10626890-01	2.00684350-01	1.97427270-01	1.96447310-01	1.96595680-01	1.96550670-01
DENSITY	2.77201[illegible]0-04	3.60465310-05	4.24075180-06	4.50580130-07	4.24075250-08			
KAPPA(P)	2.01354[illegible]0-01	2.01348510-01	2.01347700-01	2.01347700-01	2.01347700-01			
KAPPA(R)	1.96542610-01	1.96541440-01	1.96541230-01	1.96541230-01	1.96541230-01			

THETA = 4999.99670 13 DENSITIES

DENSITY	[illegible].24[illegible]02710+02	6.44379360+01	1.28847828+01	2.57476910+00	5.14601480-01	1.02872902-01	1.89075870-02	3.21419930-03
KAPPA(P)	2.45556[illegible]0+00	6.35743740-01	2.76254970-01	2.11107040-01	1.98812320-01	1.96402530-01	1.95909000-01	1.95816550-01
KAPPA(P)	2.80776[illegible]0-01	2.17115680-01	2.09197080-01	1.95474180-01	1.94082680-01	1.93732100-01	1.93651910-01	1.93636420-01
DENSITY	4.94489[illegible]0-04	6.42936030-05	7.56279330-06	8.03547130-07	7.56279450-08			
KAPPA(P)	1.95800[illegible]-01	1.95797950-01	1.95797560-01	1.95797560-01	1.88594890-01			
KAPPA(R)	1.93633710-01	1.93633320-01	1.93633320-01	1.93633320-01	1.91066060-01			

THETA = 6999.99050 13 DENSITIES

DENSITY	5.37745[illegible]70+02	1.00730499+02	2.13411470+01	4.26506740+00	8.52329840-01	1.70399430-01	3.13204510-02	5.32432680-03
KAPPA(P)	9.44087[illegible]10-01	3.16119170-01	2.075[illegible]7620-01	1.91157240-01	1.89061110-01	1.88688260-01	1.88612050-01	1.88597720-01
KAPPA(R)	2.41766470-01	2.05131770-01	1.94883760-01	1.91923770-01	1.91269660-01	1.91112120-01	1.91074860-01	1.91067600-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 6999.99690 CONTINUED

DENSITY	5.19123270-04	1.06485907-04	1.25278048-05	1.33107993-06	1.25278070-07
KAPPA(P)	1.80595270-01	1.88594890-01	1.88594890-01	1.88594890-01	1.88594890-01
KAPPA(R)	1.91066260-01	1.91065060-01	1.91066060-01	1.91066060-01	1.91066060-01

THETA = 9999.99020 13 DENSITIES

DENSITY	9.17984940+02	1.82214740+02	3.64384290+01	7.29241830+00	1.45532420+00	2.90951700-01	5.34787450-02	9.09112160-03
KAPPA(P)	5.33719960-01	2.42369700-01	1.96079120-01	1.89732130-01	1.88821900-01	1.88640150-01	1.88603190-01	1.88596200-01
KAPPA(R)	2.19407280-01	1.98864020-01	1.93026840-01	1.91479410-01	1.91173290-01	1.91088800-01	1.91070270-01	1.91066830-01
DENSITY	1.39862737-03	1.81821530-04	2.13907940-05	2.27277280-06	2.13907980-07			
KAPPA(P)	1.80595060-01	1.88594890-01	1.88594890-01	1.88594890-01	1.88594890-01			
KAPPA(R)	1.91066260-01	1.91056060-01	1.91066060-01	1.91066060-01	1.91066060-01			

38 JIANE/SCAT S-1A TEMP(50.-10000.)EV. SADY INPUT TAPE 3327 11-8-67 MATERL = 1016 NK = 615

GREY ABSORPTION COEFFICIENTS 15 TEMPERATURES

THETA = 50.00000 13 DENSITIES

DENSITY	9.08495150-01	1.62767900-01	2.89210380-02	5.13478150-03	9.16709450-04	1.66886450-04	2.81351740-05	4.43377148-06
KAPPA(P)	4.86754400+04	3.11062130+04	1.31420445+04	3.65752480+03	5.60796430+02	9.98783490+01	1.96103390+01	3.75749308+00
KAPPA(R)	1.70577500+04	7.23172920+03	2.59778630+03	9.16736850+02	2.13172340+02	4.28152760+01	7.58985860+00	1.42049527+00
DENSITY	6.44565140-07	8.17851630-08	9.57950440-09	1.01720332-09	9.57366540-11			
KAPPA(P)	7.85407660-01	2.00049050-01	1.87163280-01	1.78087550-01	1.77156810-01			
KAPPA(R)	3.90988050-01	2.08840390-01	1.79032480-01	1.74665940-01	1.74013390-01			

THETA = 69.99998 13 DENSITIES

DENSITY	1.26211185+00	2.23607050-01	3.95451580-02	7.03163550-03	1.26216471-03	2.32668020-04	4.06143140-05	6.77351840-06
KAPPA(P)	3.76089030+04	2.41357630+04	9.27599230+03	2.17197683+03	3.41143080+02	5.93495730+01	1.06962367+01	1.88354359+00
KAPPA(R)	1.25243058+04	7.40673440+03	2.90800030+03	8.19117030+02	1.58297460+02	2.46454420+01	3.92060110+00	7.36195130-01
DENSITY	1.03774556-06	1.34812630-07	1.58588220-08	1.68498368-09	1.58586660-10			
KAPPA(P)	4.30201640-01	2.08953820-01	1.80725670-01	1.77447230-01	1.77102250-01			
KAPPA(R)	2.70435140-01	1.91759740-01	1.78064220-01	1.74518760-01	1.73918060-01			

THETA = 99.99998 13 DENSITIES

DENSITY	1.81084012+00	3.13959550-01	5.66370450-02	1.02450564-02	1.90963532-03	3.71633660-04	6.78182680-05	1.15118923-05
KAPPA(P)	2.30642700+04	1.36994226+04	4.62491330+03	8.73952460+02	1.32165500+02	2.33503970+01	3.89798590+00	7.62189320-01
KAPPA(R)	5.35586750+03	4.12983190+03	2.04882550+03	4.79783010+02	6.21765500+01	8.94487740+00	1.48729418+00	4.19163260-01
DENSITY	1.77058598-06	2.30164860-07	2.70781200-08	2.87702260-09	2.70748700-10			
KAPPA(P)	2.64521960-01	1.88240100-01	1.78472810-01	1.77207480-01	1.77101550-01			
KAPPA(R)	2.32104400-01	1.86290310-01	1.75659640-01	1.74039330-01	1.73889540-01			

THETA = 149.99995 13 DENSITIES

DENSITY	2.83097450+00	5.01260330-01	9.17977040-02	1.74666840-02	3.41143240-03	6.77792090-04	1.24405280-04	2.11402890-05
KAPPA(P)	1.04958854+04	5.29010810+03	1.29075930+03	1.94732720+02	3.35256890+01	6.48186960+00	1.28281745+00	3.53340810-01
KAPPA(R)	1.47344420+03	9.86492750+02	4.32137550+02	1.02159874+02	1.85198280+01	3.33811400+00	7.71158380-01	3.63598550-01
DENSITY	5.24979060-06	4.20206350-07	4.81256810-08	4.89850180-09	4.41510240-10			
KAPPA(P)	2.06643950-01	1.82594760-01	1.84026230-01	1.91657750-01	1.99533520-01			
KAPPA(R)	1.99137250-01	1.78389660-01	1.60160710-01	1.64019420-01	1.95872570-01			

THETA = 224.99990 13 DENSITIES

DENSITY	4.63216790+00	8.47709560-01	1.61569320-01	3.15666850-02	6.23664470-03	1.23752605-03	2.23491990-04	3.65777670-05
KAPPA(P)	3.66315630+03	1.35842330+03	2.87432180+02	5.24723810+01	1.02884918+01	2.44293010+00	8.51529440-01	4.21639840-01
KAPPA(R)	3.89595060+02	1.89305090+02	5.97253140+01	1.45983874+01	3.46601310+00	9.57381010-01	3.80407390-01	2.35162150-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99950 CONTINUED

DENSITY	5.39315540-06	6.83627600-07	8.00263430-08	8.49702280-09	7.99655740-10			
KAPPA(P)	2.62402420-01	2.12610380-01	2.03515670-01	2.02487320-01	2.02366070-01			
KAPPA(R)	2.03256410-01	1.99158560-01	1.99836580-01	1.98796470-01	1.98694460-01			

THETA = 340.00012 13 DENSITIES

DENSITY	7.99965550+00	1.51720599+00	2.92844060-01	5.68937960-02	1.09008231-02	2.08999420-03	3.74742290-04	6.32378240-05
KAPPA(P)	1.19963410+03	4.46329710+02	1.05825018+02	3.05106550+01	1.08871583+01	3.41250280+00	9.28766970-01	3.33269430-01
KAPPA(R)	1.74739910+02	6.45537260+01	1.79317330+01	4.73888080+00	1.42633409+00	5.48126050-01	2.93374590-01	2.21898320-01
DENSITY	9.71489790-06	1.26263473-06	1.48541720-07	1.57824100-08	1.48540259-09			
KAPPA(P)	2.22404160-01	2.04637740-01	2.02526410-01	2.02383670-01	2.02373760-01			
KAPPA(R)	2.05901550-01	2.01221500-01	1.98944170-01	1.98726850-01	1.98714130-01			

THETA = 499.99993 13 DENSITIES

DENSITY	1.34373073+01	2.57738130+00	4.90864130-01	9.33236230-02	1.81914250-02	3.61054710-03	6.62525850-04	1.12590534-04
KAPPA(P)	6.17531440+02	2.79906310+02	9.28384560+01	2.69560820+01	6.58723040+00	1.54592740+00	4.50000760-01	2.37396870-01
KAPPA(R)	1.99362950+02	5.86330030+01	1.54476204+01	3.54056740+00	9.20082550-01	3.98579500-01	2.68691610-01	2.22968220-01
DENSITY	1.73204970-05	2.23164380-06	2.64900920-07	2.61457350-08	2.64900970-09			
KAPPA(P)	2.05543510-01	2.02740180-01	2.02506560-01	2.02481050-01	2.02478410-01			
KAPPA(P)	2.02320950-01	1.99141630-01	1.98944970-01	1.98924880-01	1.98922690-01			

THETA = 699.99976 13 DENSITIES

DENSITY	2.13749930+01	4.04132250+00	7.71962270-01	1.50609630-01	2.99019370-02	5.97040210-03	1.09710763-03	1.86495600-04
KAPPA(P)	6.03569570+02	2.14785090+02	5.35194410+01	1.24117919+01	2.75789580+00	7.09430030-01	2.77183640-01	2.10826240-01
KAPPA(R)	2.05414050+02	7.04629430+01	1.50889995+01	2.96150320+00	8.22774670-01	3.90783260-01	2.45894180-01	2.05113050-01
DENSITY	2.86912050-05	3.72985970-06	4.38805310-07	4.66230950-08	4.38805390-09			
KAPPA(P)	2.03513170-01	2.02764710-01	2.02472270-01	2.02661340-01	2.02660110-01			
KAPPA(R)	1.99715260-01	1.99247800-01	1.99193610-01	1.99197030-01	1.99186440-01			

THETA = 999.99967 13 DENSITIES

DENSITY	3.47367140+01	6.53370180+00	1.29251857+00	2.55910120-01	5.09992680-02	1.01918697-02	1.87319462-03	3.18433170-04
KAPPA(P)	5.41387090+02	9.35975130+01	2.08269900+01	4.39626790+00	1.03499764+00	3.29743240-01	2.17465730-01	2.04207630-01
KAPPA(R)	9.92167010+01	3.44644370+01	7.50556690+00	1.57728481+00	4.83241270-01	2.53733440-01	2.06243660-01	1.99601830-01
DENSITY	4.89494310-05	6.36860610-06	7.49252350-07	7.96081040-08	7.49252570-09			
KAPPA(P)	2.02660720-01	2.02432250-01	2.02402090-01	2.02398450-01	2.02398040-01			
KAPPA(R)	1.98994120-01	1.98899220-01	1.98886490-01	1.98885100-01	1.98884900-01			

GREY ABSORPTION COEFFICIENTS   CONTINUED

THETA = 1499.99930   13 DENSITIES

DENSITY	6.17132760+01	1.19859483+01	2.36249290+00	4.69572630-01	9.36655650-02	1.87226170-02	3.44124490-03	5.84998090-04
KAPPA(P)	1.34283060+02	3.25122510+01	7.01524580+00	1.50845642+00	4.24896490-01	2.34024140-01	2.05374320-01	2.01196750-01
KAPPA(R)	1.94075460+01	5.82924200+00	1.43578407+00	4.52933120-01	2.53428890-01	2.08144440-01	1.98973420-01	1.97484930-01
DENSITY	5.74993060-05	1.16999033-05	1.37645396-06	1.46248300-07	1.37645438-08			
KAPPA(P)	2.00535490-01	2.00431240-01	2.00417410-01	2.00415810-01	2.00415610-01			
KAPPA(R)	1.97251250-01	1.97213370-01	1.97208440-01	1.97207850-01	1.97207660-01			

THETA = 2249.99670   13 DENSITIES

DENSITY	1.11613604+02	2.18710530+01	4.33293860+00	8.62335640-01	1.72061730-01	3.43950020-02	6.32194740-03	1.07470937-03
KAPPA(P)	4.90336470+01	1.05760233+01	2.44033630+00	6.14193210-01	2.65004890-01	2.08325820-01	1.98999290-01	1.97413650-01
KAPPA(R)	5.85841760+00	9.90187150-01	3.95614310-01	2.47333910-01	2.08170040-01	1.97839930-01	1.95468700-01	1.95017880-01
DENSITY	1.65239430-04	2.14941460-05	2.52871320-06	2.68675920-07	2.52871360-08			
KAPPA(P)	1.97138040-01	1.97095080-01	1.97089370-01	1.97088780-01	1.97088580-01			
KAPPA(R)	1.94935620-01	1.94921760-01	1.94920010-01	1.94919820-01	1.94919820-01			

THETA = 3400.00050   13 DENSITIES

DENSITY	2.04562490+02	4.02539430+01	8.01739830+00	1.60158295+00	3.19603850-01	6.38905390-02	1.17434227-02	1.99634550-03
KAPPA(P)	1.57919063+01	4.05565200+00	9.56128820-01	3.22807210-01	2.15184380-01	1.97754090-01	1.94590090-01	1.94032620-01
KAPPA(R)	5.62406640-01	3.94254870-01	2.47606110-01	2.07624110-01	1.96751650-01	1.93877840-01	1.93177070-01	1.93051750-01
DENSITY	3.07128940-04	3.99259130-05	4.69726610-06	4.99094730-07	4.69726690-08			
KAPPA(P)	1.93935620-01	1.93920490-01	1.93918360-01	1.93918170-01	1.93918170-01			
KAPPA(R)	1.93029460-01	1.93025490-01	1.93025100-01	1.93025100-01	1.93025100-01			

THETA = 4999.99670   13 DENSITIES

DENSITY	3.59422470+02	7.17141410+01	1.42937442+01	2.85263170+00	5.69955040-01	1.13938660-01	2.09426190-02	3.56018060-03
KAPPA(P)	3.24139590+00	7.84326410-01	2.85862320-01	2.01851090-01	1.90059330-01	1.88412410-01	1.88130760-01	1.88086930-01
KAPPA(R)	3.46170410-01	2.33359280-01	2.02744040-01	1.94046590-01	1.91671560-01	1.91096070-01	1.90969790-01	1.90953180-01
DENSITY	5.47719550-04	7.12034940-05	8.37663930-06	8.90039560-07	8.37684090-08			
KAPPA(P)	[illegible]	[illegible]	1.88077900-01	1.88077900-01	1.88077900-01			
KAPPA(R)	[illegible]	1.90949740-01	1.90949740-01	1.90949740-01	1.90949740-01			

THETA = 6999.99690   13 DENSITIES

DENSITY	5.94579620+02	1.18735909+02	2.36742270+01	4.72520520+00	9.44122190-01	1.88739220-01	3.46914850-02	5.89745140-03
KAPPA(P)	1.74563919+00	4.71963740-01	2.31469300-01	1.94044460-01	1.89007230-01	1.88223910-01	1.88104800-01	1.88082420-01
KAPPA(R)	2.79966030-01	2.15705190-01	1.97773860-01	1.92628650-01	1.91329160-01	1.91002640-01	1.90960050-01	1.90951460-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 6999.99090 CONTINUED

DENSITY	9.07296780-04	1.17948555-04	1.38762761-05	1.67435496-06	1.38762780-07
KAPPA(P)	1.88078860-01	1.88077900-01	1.88077900-01	1.88077900-01	1.88077900-01
KAPPA(R)	1.90950430-01	1.90949740-01	1.90949740-01	1.90949740-01	1.90949740-01

THETA = 9999.99920 13 DENSITIES

DENSITY	1.01435063+03	2.02673830+02	4.04163530+01	8.06793830+00	1.61204876+00	3.22265990-01	5.92346270-02	1.00697130-02
KAPPA(P)	9.30004720-01	3.13078280-01	2.06051730-01	1.90628830-01	1.88535890-01	1.88149200-01	1.88091070-01	1.88080160-01
KAPPA(R)	2.40965670-01	2.04928730-01	1.94692670-01	1.91835120-01	1.91139060-01	1.90976670-01	1.90954890-01	1.90950700-01

DENSITY	1.54919237-03	2.01393690-04	2.36932600-05	2.51740990-06	2.36932640-07
KAPPA(P)	1.88078280-01	1.88077900-01	1.88077900-01	1.88077900-01	1.88077900-01
KAPPA(R)	1.90949530-01	1.90949740-01	1.90949740-01	1.90949740-01	1.90949740-01

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 56        JIANE/SCAT  SHALE-1B  INPUT TAPES(4428,2408,4027)  11-7-67  CI/LN                      MATERL = 1129     NX = 904

GREY ABSORPTION COEFFICIENTS              24   TEMPERATURES

THETA =      1.50000                      13   DENSITIES

 DENSITY  2.44458940-01  2.86242790-02  2.49521350-03  3.50395170-04  4.21557290-05  5.80814110-06  8.66174010-07  1.32838730-07
KAPPA(P)  5.04706240+05  3.33439250+05  2.39973780+05  9.13405340+04  2.15130710+04  4.40292310+03  8.39385390+02  1.24008417+02
KAPPA(R)  1.74356460+05  1.27623523+05  6.51566660+04  2.11218000+04  4.82528430+03  1.06956680+03  2.02152820+02  2.85459470+01

 DENSITY  1.96369470-08  2.53591870-09  2.75137570-10  2.29138400-11  1.83671980-12
KAPPA(P)  1.70061730+01  2.15451170+00  3.39324980-01  9.90225200-02  5.54097890-02
KAPPA(R)  3.59659290+00  4.93044370-01  1.13379782-01  5.70573140-02  5.05974050-02

THETA =      2.25000                      13   DENSITIES

 DENSITY  1.22306463-01  1.55035693-02  1.33347353-03  2.54861070-04  4.18754860-05  7.64866070-06  1.30323633-06  1.86087300-07
KAPPA(P)  6.52260360+05  4.33600980+05  2.35449360+05  9.76749010+04  1.73955890+04  2.73652170+03  4.66142300+02  9.56755600+01
KAPPA(R)  5.02866390+05  2.57276360+05  1.24727636+05  3.56330900+04  7.33129160+03  1.20412920+03  1.91161950+02  3.41043510+01

 DENSITY  2.33506750-08  2.79330620-09  3.39197800-10  3.03653240-11  2.54986700-12
KAPPA(P)  1.75603610+01  2.41219540+00  3.55859240-01  9.52233600-02  6.84922960-02
KAPPA(R)  5.26628490+00  7.31892440-01  1.51137840-01  7.13141870-02  6.54473690-02

THETA =      3.40000                      13   DENSITIES

 DENSITY  9.23501450-02  1.33655741-02  2.36699590-03  3.41315600-04  5.59582320-05  9.21719320-06  1.51370546-06  2.34870880-07
KAPPA(P)  5.41890660+05  3.29713690+05  1.95743400+05  7.00475770+04  1.59479242+04  2.86834350+03  4.63444170+02  7.50125140+01
KAPPA(R)  4.64445300+05  2.81199570+05  1.23981778+05  3.48399480+04  6.90776150+03  1.21096150+03  1.89630980+02  2.87829720+01

 DENSITY  3.22596460-08  3.79523330-09  4.32572540-10  4.44809580-11  3.81362870-12
KAPPA(P)  1.16660438+01  1.67511059+00  2.61969810-01  9.47232300-02  8.18185750-02
KAPPA(R)  4.32458420+00  6.47107530-01  1.47200740-01  8.26755810-02  7.95591900-02

THETA =      5.00000                      13   DENSITIES

 DENSITY  9.77504470-02  1.65019460-02  2.58958410-03  4.13626580-04  7.06272920-05  1.23226687-05  2.02619690-06  3.25468560-07
KAPPA(P)  4.04109640+05  2.74679400+05  1.67167220+05  5.41379100+04  1.08395844+04  1.83939490+03  2.78383020+02  4.18612240+01
KAPPA(R)  3.34629410+05  2.20173220+05  1.03801937+05  2.98879300+04  5.41887750+03  8.39132760+02  1.25161635+02  1.82408570+01

 DENSITY  4.68760070-08  5.62858520-09  6.35874480-10  6.28651000-11  5.58369820-12
KAPPA(P)  7.16342470+00  1.14666140+00  2.15206120-01  1.07942026-01  9.79355190-02
KAPPA(R)  2.86411490+00  4.74487830-01  1.41883920-01  9.86413250-02  9.56097950-02

THETA =      7.00000                      13   DENSITIES

 DENSITY  1.15516451-01  1.96681040-02  3.20123380-03  5.34163810-04  9.22752220-05  1.68106150-05  2.83142630-06  4.50652210-07
KAPPA(P)  2.98674580+05  2.08931120+05  1.18932327+05  3.30180590+04  6.03000960+03  1.01278978+03  1.70380470+02  2.90315730+01
KAPPA(R)  2.05050160+05  1.52855740+05  7.29055400+04  1.87024340+04  2.79025410+03  4.58598430+02  8.10912420+01  1.31238470+01
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GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 7.00000 CONTINUED

DENSITY	6.45536010-08	7.94146760-09	8.59371330-10	8.35981320-11	7.63056060-12			
KAPPA(P)	5.25164440+00	6.49100600-01	2.02970220-01	1.25757220-01	1.17671552-01			
KAPPA(R)	2.06359210+00	3.60568540-01	1.47163560-01	1.18715427-01	1.15207202-01			

THETA = 10.00000 13 DENSITIES

DENSITY	1.48566740-01	2.56901920-02	4.28213740-03	7.39079590-04	1.30389560-04	2.37568420-05	4.00378660-06	6.23922350-07
KAPPA(P)	2.09523240+05	1.44014590+05	7.59643880+04	2.01113570+04	3.77061340+03	6.90668480+02	1.22046358+02	2.21494120+01
KAPPA(R)	1.19483061+05	9.03213740+04	3.85079490+04	9.05647170+03	1.65372070+03	2.97003800+02	5.08378410+01	8.75394940+00
DENSITY	3.60791550-08	1.09863161-08	1.25117857-09	1.30167390-10	1.19177781-11			
KAPPA(P)	3.96410450+00	6.57459540-01	1.30163640-01	1.30997770-01	1.27961480-01			
KAPPA(R)	1.44730511+00	3.02493480-01	1.48622900-01	1.25732960-01	1.25668350-01			

THETA = 15.00000 13 DENSITIES

DENSITY	2.02654440-01	3.61504630-02	6.19205670-03	1.08067658-03	1.89837900-04	3.43036090-05	5.89780730-06	9.64341830-07
KAPPA(P)	1.34543210+05	9.42635540+04	4.39136240+04	1.12355472+04	2.09956600+03	3.74907730+02	6.28362380+01	1.06266815+01
KAPPA(R)	5.42353030+04	5.71514460+04	2.43196490+04	6.33703920+03	1.15976530+03	1.89870630+02	2.82651330+01	4.41146560+00
DENSITY	1.43974450-07	1.81744360-08	2.07429370-09	2.14457420-10	1.95731990-11			
KAPPA(P)	1.79269209+00	3.52242650-01	1.54539270-01	1.41739980-01	1.42742210-01			
KAPPA(R)	6.28079420-01	2.36837990-01	1.51921700-01	1.39072340-01	1.40161070-01			

THETA = 22.49999 13 DENSITIES

DENSITY	2.94172760-01	5.21173170-02	9.00765990-03	1.59587969-03	2.89478370-04	5.49043520-05	9.71344110-06	1.59523410-06
KAPPA(P)	9.30294290+04	6.37540030+04	2.49365080+04	5.64185900+03	1.04628280+03	1.86982670+02	3.33954270+01	6.10936590+00
KAPPA(R)	6.02218260+04	4.03748370+04	1.70970620+04	3.79058620+03	5.89845700+02	9.65523150+01	1.66357990+01	2.75435420+00
DENSITY	2.37274060-07	2.98059870-08	3.39971550-09	3.48532410-10	3.18466160-11			
KAPPA(P)	1.12044258+00	2.98707840-01	1.69947620-01	1.58327120-01	1.60943960-01			
KAPPA(R)	5.57961450-01	2.20413930-01	1.61846810-01	1.55075830-01	1.57982650-01			

THETA = 33.99998 13 DENSITIES

DENSITY	4.40152030-01	7.81939510-02	1.39251883-02	2.55549080-03	4.79592410-04	9.14801180-05	1.61469400-05	2.64362370-06
KAPPA(P)	5.97270320+04	3.79505130+04	1.43363122+04	3.45523890+03	5.77427540+02	1.04815529+02	1.93741740+01	3.69709720+00
KAPPA(R)	2.89478240+04	2.13533500+04	8.92407450+03	1.92170280+03	3.29313750+02	5.47321860+01	9.22807980+00	1.75662990+00
DENSITY	3.92963250-07	4.96091820-08	5.64836350-09	5.76543740-10	5.28554760-11			
KAPPA(P)	7.66193440-01	2.49997340-01	1.80188270-01	1.76725420-01	1.80004570-01			
KAPPA(R)	4.28804790-01	2.02259450-01	1.71317620-01	1.72827210-01	1.76720310-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 50.00000 13 DENSITIES

DENSITY	6.73458470-01	1.23152212-01	2.27009150-02	4.15194630-03	9.02475680-04	1.53074470-04	2.69442680-05	4.37716230-06
KAPPA(P)	2.46132450+04	1.13340540+04	3.92020760+03	9.43049660+02	2.30642510+02	5.60816100+01	1.12092123+01	2.28991490+00
KAPPA(R)	1.04413426+04	6.24751440+03	2.45219040+03	5.55133690+02	1.26520957+02	2.68708740+01	4.87063830+00	9.40940290-01

DENSITY	6.49911010-07	8.13715540-08	9.33439490-09	9.05492100-10	9.23680580-11
KAPPA(P)	5.47074710-01	2.36591320-01	1.49504640-01	1.63642560-01	1.83604370-01
KAPPA(R)	3.01442600-01	1.93200230-01	1.43035990-01	1.60121070-01	1.80263610-01

THETA = 69.99996 13 DENSITIES

DENSITY	1.01401431+00	1.95597230-01	3.44539370-02	6.45364650-03	1.20707044-03	2.28326250-04	4.02818340-05	6.62712220-06
KAPPA(P)	1.25268957+04	6.11324470+03	2.09334680+03	5.37814640+02	1.38991520+02	3.26335520+01	6.97327510+00	1.46885235+00
KAPPA(R)	6.04261960+03	3.65534120+03	1.43375750+03	3.42791740+02	7.02716360+01	1.28736808+01	2.40605190+00	5.84419280-01

DENSITY	1.00525435-06	1.29345530-07	1.51981550-08	1.60264600-09	1.49849470-10
KAPPA(P)	3.92541420-01	2.12213680-01	1.34360760-01	1.36550740-01	1.87425840-01
KAPPA(R)	2.61449010-01	1.95174930-01	1.34445460-01	1.83364560-01	1.84050150-01

THETA = 99.99998 13 DENSITIES

DENSITY	1.58666453+00	2.90940060-01	5.32373660-02	9.85998150-03	1.86215661-03	3.60368650-04	6.53053890-05	1.10124956-05
KAPPA(P)	6.70655910+03	4.20011930+03	1.35936870+03	3.27930260+02	7.68164620+01	1.68397810+01	3.44114400+00	7.43761690-01
KAPPA(R)	4.45139990+03	2.61549580+03	9.21519620+02	1.99111330+02	3.60037800+01	6.56348690+00	1.30914793+00	4.07831410-01

DENSITY	1.68155775-06	2.17075640-07	2.53877300-08	2.05927250-09	2.46682310-10
KAPPA(P)	2.73691970-01	1.99939050-01	1.93471440-01	1.91040660-01	1.94384140-01
KAPPA(R)	2.33371420-01	1.95996980-01	1.37496710-01	1.87604730-01	1.90844560-01

THETA = 149.99995 13 DENSITIES

DENSITY	2.63004480+00	4.77118330-01	8.90153840-02	1.66915610-02	3.25555350-03	6.42889320-04	1.17087747-04	1.96854660-05
KAPPA(P)	5.93779400+03	2.50782970+03	6.65045850+02	1.50454540+02	3.21842420+01	6.96029590+00	1.50405469+00	4.43384270-01
KAPPA(R)	2.62266090+03	1.47229100+03	4.52468410+02	9.17273910+01	1.62851070+01	3.48989970+00	8.72082720-01	3.36072960-01

DENSITY	2.97528740-06	3.79602950-07	4.41174710-08	4.67498530-09	4.39857640-10
KAPPA(P)	2.42707360-01	2.05331630-01	2.00741550-01	2.00304210-01	2.00259950-01
KAPPA(R)	2.21581440-01	1.98860840-01	1.96845130-01	1.96646810-01	1.96617310-01

THETA = 224.99990 13 DENSITIES

DENSITY	4.35543480+00	8.05370950-01	1.52691610-01	2.95127570-02	5.79840730-03	1.13559222-03	2.04881050-04	3.44621160-05
KAPPA(P)	2.96852930+03	9.42824340+02	2.23476650+02	5.51553080+01	1.41115692+01	3.83090470+00	1.03729887+00	3.57295090-01
KAPPA(R)	1.23988130+03	5.76699280+02	1.68681270+02	3.84956380+01	8.43035580+00	1.86514106+00	5.20306510-01	2.62832580-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 224.99990 CONTINUED

DENSITY	5.20646510-05	6.86091150-07	8.08047620-08	8.59550960-09	8.08047760-10			
KAPPA(P)	2.24853320-01	2.07436980-01	2.00528360-01	2.00294400-01	2.00259150-01			
KAPPA(R)	2.10374500-01	1.99503590-01	1.97253610-01	1.96690080-01	1.96614360-01			

THETA = 340.00012 13 DENSITIES

DENSITY	7.48180420+00	1.41354278+00	2.72360150-01	5.24120030-02	1.03098763-02	2.04634100-03	3.75427190-04	6.37975350-05
KAPPA(P)	1.37510000+03	4.04239570+02	1.13109527+02	3.23777010+01	7.71601450+00	1.76475627+00	4.86139130-01	2.48858950-01
KAPPA(R)	5.99368490+02	2.41531520+02	7.41738430+01	1.80725910+01	3.51334650+00	8.47000750-01	3.40630150-01	2.33728520-01
DENSITY	9.61430070-06	1.27583472-06	1.50068510-07	1.59383160-08	1.49660024-09			
KAPPA(P)	2.07663770-01	2.01213450-01	2.00382950-01	2.00390950-01	2.00844960-01			
KAPPA(R)	2.05536420-01	1.98002100-01	1.96790810-01	1.96745160-01	1.97184980-01			

THETA = 499.99953 13 DENSITIES

DENSITY	1.20537576+01	2.41185750+00	4.67220530-01	9.17929310-02	1.82378350-02	3.64188460-03	6.69185690-04	1.13706052-04
KAPPA(P)	6.81932090+02	2.48732290+02	6.52402120+01	1.42186003+01	2.95894560+00	7.43687470-01	2.99548770-01	2.17681120-01
KAPPA(R)	2.50202030+02	1.38572690+02	3.93523220+01	7.99083280+00	1.70858766+00	5.35350610-01	2.77076680-01	2.13342800-01
DENSITY	1.74641360-05	2.26335840-06	2.65659610-07	2.82034980-08	2.65418040-09			
KAPPA(P)	2.03621470-01	2.01740110-01	2.01847460-01	2.01948610-01	2.01963150-01			
KAPPA(R)	1.99729560-01	1.97972920-01	1.98156530-01	1.99270890-01	1.98282200-01			

THETA = 699.99976 13 DENSITIES

DENSITY	2.01277600+01	3.90075060+00	7.64304120-01	1.51509940-01	3.01714850-02	6.02130670-03	1.10389439-03	1.87167990-04
KAPPA(P)	3.94860050+02	1.32293049+02	2.51767260+01	5.22172590+00	1.24830195+00	4.35494770-01	2.53845110-01	2.12607400-01
KAPPA(R)	1.15149921+02	4.35493190+01	1.29356967+01	2.84290940+00	7.80212860-01	3.34599160-01	2.27626080-01	2.04313840-01
DENSITY	2.87569610-05	3.73728950-06	4.39661830-07	4.67136320-08	4.39657500-09			
KAPPA(P)	2.03750920-01	2.02173130-01	2.01984160-01	2.01968000-01	2.01966580-01			
KAPPA(R)	1.99629720-01	1.98571500-01	1.98311350-01	1.98290530-01	1.98288940-01			

THETA = 999.99967 13 DENSITIES

DENSITY	3.36303170+01	6.58229840+00	1.29916375+00	2.57749790-01	5.12554160-02	1.02227571-02	1.87728628-03	3.19064920-04
KAPPA(P)	1.62670220+02	4.12311060+01	9.27570830+00	2.32109810+00	7.46063690-01	3.33418770-01	2.25842370-01	2.05508680-01
KAPPA(R)	4.30412060+01	1.55728950+01	3.34315430+00	1.02883128+00	4.12964350-01	2.59791470-01	2.14386030-01	2.01748380-01
DENSITY	4.90548560-05	6.38097320-06	7.50707310-07	7.97626960-08	7.50700020-09			
KAPPA(P)	2.02417460-01	2.02048200-01	2.02004560-01	2.01999310-01	2.01998700-01			
KAPPA(R)	1.98735790-01	1.98409530-01	1.98376210-01	1.98372240-01	1.98371840-01			

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 1999.99920 13 DENSITIES

DENSITY	6.60679030+01	1.19774240+01	2.37155910+00	4.70923000-01	9.38701340-02	1.87599120-02	3.44795580-03	5.86134090-04
KAPPA(P)	6.67771620+01	1.72041730+01	4.64912810+00	1.23906760+00	4.17520840-01	2.39947290-01	2.07044930-01	2.03007900-01
KAPPA(R)	1.93280030+01	7.21769920+00	2.00064000+00	6.39385080-01	3.15379690-01	2.23529920-01	2.02227900-01	1.99254770-01
DENSITY	9.01740[illegible]0-05	1.17226232-05	1.37912670-06	1.46532300-07	1.37912730-08			
KAPPA(P)	2.02351700-01	2.02236590-01	2.02221220-01	2.02219610-01	2.02219400-01			
KAPPA(R)	1.98839[illegible]0-01	1.98774750-01	1.98766200-01	1.98765200-01	1.98765200-01			

THETA = 2299.99670 13 DENSITIES

DENSITY	1.10769446+02	2.19426610+01	4.32697630+00	8.69430900-01	1.72397920-01	3.44618630-02	6.33421750-03	1.07679525-03
KAPPA(P)	3.00[illegible]+01	8.35519930+00	2.33959960+00	5.54532920-01	2.63076080-01	2.13304410-01	2.04412550-01	2.02809940-01
KAPPA(R)	6.29797340+00	2.72157320+00	8.42769120-01	3.31171140-01	2.23904200-01	2.03763140-01	1.99925390-01	1.99212540-01
DENSITY	1.65660[illegible]90-04	2.15553360-05	2.53362370-06	2.09197670-07	2.53362420-08			
KAPPA(P)	2.02580590-01	2.02494260-01	2.02492590-01	2.02491980-01	2.02491980-01			
KAPPA(R)	1.99096620-01	1.99078510-01	1.99076120-01	1.99075720-01	1.99075720-01			

THETA = 3000.00050 13 DENSITIES

DENSITY	2.03154120+02	4.02712150+01	8.03060610+00	1.60352173+00	3.20224490-01	6.40145430-02	1.17662154-02	2.09021020-03
KAPPA(P)	1.07941462+01	2.70113430+00	6.87323160-01	2.84308260-01	2.18262670-01	2.04729200-01	2.01897320-01	2.01423820-01
KAPPA(R)	1.31484267+00	5.46700970-01	2.90546390-01	2.19539300-01	2.03004520-01	1.99102800-01	1.98145230-01	1.97989750-01
DENSITY	3.07725020-04	4.00040470-05	4.70633710-06	5.00053900-07	4.70636850-08			
KAPPA(P)	2.01575060-01	2.01563650-01	2.01562050-01	2.01561850-01	2.01561850-01			
KAPPA(R)	1.98120470-01	1.98115590-01	1.98115910-01	1.98115910-01	1.98115910-01			

THETA = 4999.99670 13 DENSITIES

DENSITY	3.61377660+02	7.17499360+01	1.43173912+01	2.85800540+00	5.71062910-01	1.14159920-01	2.09832670-02	3.56709050-03
KAPPA(P)	4.99263670+00	1.21425496+00	3.88265900-01	2.32631180-01	2.05011340-01	1.99849640-01	1.98799200-01	1.98520880-01
KAPPA(R)	4.73150010-01	2.78194970-01	2.20132640-01	2.02574210-01	1.97462610-01	1.96228390-01	1.95947210-01	1.95927420-01
DENSITY	[illegible]	7.13[illegible]15230-05	[illegible]-06	8.41767310-07	[illegible]-08			
KAPPA(P)	[illegible]	[illegible]-01	[illegible]-01	[illegible]-01	[illegible]-01			
KAPPA(R)	1.95915600-01	1.95917230-01	1.95917030-01	1.95917030-01	1.95917030-01			

THETA = 6999.99690 13 DENSITIES

DENSITY	5.97917010+02	1.18798401+02	2.37139610+01	4.73014420+00	9.45959560-01	1.89105910-01	3.47588170-02	5.90889160-03
KAPPA(P)	2.47299280+00	6.22176540-01	2.73390260-01	2.10491980-01	1.98709560-01	1.96414700-01	1.95942890-01	1.95854540-01
KAPPA(R)	3.04808540-01	2.24583660-01	2.03070920-01	1.96685930-01	1.94767840-01	1.94298040-01	1.94192180-01	1.94171900-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 8999.99090 CONTINUED

DENSITY	9.04057740-04	1.18177350-04	1.39032225-05	1.47721801-06	1.39032240-07
KAPPA(P)	1.95339070-01	1.95536720-01	1.95836330-01	1.95836330-01	1.95836330-01
KAPPA(R)	1.94168290-01	1.94157710-01	1.94167710-01	1.94167710-01	1.94167710-01

THETA = 9999.99020 13 DENSITIES

DENSITY	1.02019093+03	2.02799340+02	4.04513480+01	8.08324170+00	1.61518903+00	3.22892120-01	5.93496530-02	1.00892579-02
KAPPA(P)	1.00306098+00	3.51272850-01	2.19352770-01	1.96481300-01	1.88379640-01	1.88123050-01	1.88078840-01	1.88070570-01
KAPPA(R)	2.31799020-01	2.02720930-01	1.94603320-01	1.92371570-01	1.91083070-01	1.90968450-01	1.90951650-01	1.90948400-01
DENSITY	1.55218756-03	2.01784360-04	2.37392690-05	2.52229850-06	2.37392730-07			
KAPPA(P)	1.88069070-01	1.88068380-01	1.88068880-01	1.88068880-01	1.88068880-01			
KAPPA(R)	1.90947830-01	1.90947330-01	1.90947830-01	1.90947830-01	1.90947830-01			

18 D.ANE/12FREQUENCIES LN/RS 3/3/67 TAPE 1809 THETA(1.-10.)EV/W/FROMSD2 MATERL = 1074 NK = 287

GREY ABSORPTION COEFFICIENTS 7 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	5.25923750-01	6.65172490-02	7.13826190-03	9.51453760-04	1.56433600-04	2.90498800-05	4.70243570-06	6.06531040-07
KAPPA(P)	2.35790710+03	1.02305240+05	1.13453677+05	4.51001120+04	8.64829920+03	1.60997180+03	3.00542610+02	5.66463740+01
KAPPA(R)	5.30295600+03	4.99610350+04	2.95414570+04	8.75674870+03	1.39511330+03	1.72127750+02	2.73968760+01	5.19629040+00
DENSITY	7.47206060-01	5.33373420-09	8.04595830-10	7.85897430-11	7.30925470-12			
KAPPA(P)	8.45331790+01	9.03402420-01	7.37494850-02	1.29591137-02	7.20975710-03			
KAPPA(R)	7.60525060-02	8.87725210-02	1.63434190-02	7.76815180-03	6.68188620-03			

THETA = 1.55000 13 DENSITIES

DENSITY	3.35460490-02	4.63259310-02	7.32974910-03	1.19507423-03	1.86115530-04	2.93449540-05	4.48447140-06	6.35788450-07
KAPPA(P)	2.02148510+03	1.50354390+05	1.34123990+05	6.51143330+04	1.36389629+04	1.93168700+03	2.28772930+02	2.36364480+01
KAPPA(R)	1.00212572+03	5.55378920+04	4.12439600+04	9.60929730+03	1.60895790+03	2.56144550+02	3.21044920+01	3.40099400+00
DENSITY	5.90295530-01	1.14232216-08	1.33610141-09	1.07703260-10	1.13222661-11			
KAPPA(P)	2.10797450+01	2.14179610-01	3.11387270-02	1.14671163-02	9.45594190-03			
KAPPA(R)	5.25335030-02	4.05947910-02	1.16718070-02	7.76742950-03	7.97392870-03			

THETA = 2.25000 13 DENSITIES

DENSITY	3.44074520-02	5.31160010-02	6.34575460-03	1.25894404-03	2.05472780-04	3.58449770-05	6.22224410-06	1.02188666-06
KAPPA(P)	1.60147600+03	1.32301020+05	1.02560751+05	4.24223210+04	5.66724440+03	7.64736210+02	8.80755480+01	1.37525601+01
KAPPA(R)	5.75419730+04	5.67519630+04	3.39787270+04	8.86875700+03	1.21941550+03	1.56461970+02	1.80346870+01	2.66219610+00
DENSITY	1.43725500-01	1.54143500-08	1.40452242-09	1.70337410-10	1.38388699-11			
KAPPA(P)	3.03535760+01	5.71646770-01	8.07779700-02	1.49594840-02	1.25598758-02			
KAPPA(R)	5.33605520-02	9.39100330-02	2.24175530-02	1.27990820-02	1.19417096-02			

THETA = 3.40000 13 DENSITIES

DENSITY	5.75093430-01	5.03705190-02	9.79621730-03	1.67976397-03	3.05368280-04	5.51435980-05	8.96896740-06	1.35640875-06
KAPPA(P)	1.14300490+03	6.25005250+04	5.37184930+04	2.10168330+04	4.41954020+03	7.89693560+02	1.24366140+02	1.85486300+01
KAPPA(R)	3.11599340+04	3.35061050+04	2.31301120+04	6.29760780+03	1.17494060+03	1.97150020+02	3.25272090+01	5.20956310+00
DENSITY	1.71095450-01	1.94037060-08	2.29411240-09	2.43192000-10	2.28813250-11			
KAPPA(P)	1.95755919+01	1.22146659-01	2.21899230-02	1.41342133-02	1.33348016-02			
KAPPA(R)	3.19153060-01	4.49603180-02	1.59559100-02	1.33444860-02	1.30382621-02			

THETA = 5.00000 13 DENSITIES

DENSITY	4.80391010-02	8.17372040-02	1.39693315-02	2.41206760-03	4.08073610-04	6.43383350-05	1.04467469-05	1.74080976-06
KAPPA(P)	5.72322250+04	5.16450670+04	3.02723100+04	1.19144825+04	2.48750610+03	2.73618270+02	1.79637340+01	2.00048160+00
KAPPA(R)	2.01467420+04	1.35798300+04	1.53552226+04	5.70043030+03	1.21613120+03	1.26791243+02	7.24665510+00	5.00669430-01

GREY ABSORPTION COEFFICIENTS CONTINUED

THETA = 5.00000 CONTINUED

DENSITY	2.65793750-07	3.43236930-08	3.34902560-09	3.85966760-10	3.36058850-11
KAPPA(P)	2.77591960-01	4.81651760-02	1.92366110-02	1.59396110-02	1.62289110-02
KAPPA(R)	6.56203120-02	2.10574470-02	1.49939752-02	1.49127912-02	1.58379550-02

THETA = 7.00000 13 DENSITIES

DENSITY	6.45952000-01	1.13706911-01	1.30259120-02	2.68856150-03	4.70626880-04	9.20671820-05	1.67138970-05	2.73289260-06
KAPPA(P)	3.79703150+04	2.70340410+04	1.83266500+04	3.89723340+03	3.75310230+02	5.18334640+01	9.11898030+00	1.79340957+00
KAPPA(R)	1.30021497+04	1.30518591+04	1.00255180+04	2.25076380+03	1.61978720+02	1.25491756+01	1.71458487+00	3.08663990-01
DENSITY	3.87670550-07	4.60140130-06	4.97679380-09	4.89444580-10	4.33042700-11			
KAPPA(P)	3.66947400-01	7.64299990-02	2.78072360-02	2.10712230-02	2.09401060-02			
KAPPA(R)	7.20103750-02	2.52307200-02	2.03961520-02	1.97276680-02	2.04396020-02			

THETA = 10.00000 13 DENSITIES

DENSITY	3.51998940-01	1.33740750-01	2.10226680-02	3.90092340-03	7.44608500-04	1.37959690-04	2.30897920-05	3.58708740-06
KAPPA(P)	2.34203330+04	1.95319140+04	1.33281005+04	2.53142310+03	5.10956760+02	9.60175480+01	1.70132580+01	3.06829180+00
KAPPA(R)	9.46405390+03	1.04389257+04	3.19822380+03	4.49582730+02	6.86636510+01	1.36658084+01	2.82117370+00	5.89031150-01
DENSITY	5.10053610-07	5.99772160-06	5.07190260-09	4.57081320-10	4.10947840-11			
KAPPA(P)	5.48939630-01	1.49253910-01	1.96527280-01	3.75921500-02	3.71679670-02			
KAPPA(R)	1.38553520-01	5.18202130-02	3.47513100-02	3.55080090-02	3.65878520-02			

33 PLANE/SCAT XE-12A TEMP(1-10) 12 FREQ CI/RS 5-2-67 INPUT TAPE(S239) MATERL = 1054 NK = 287

GREY ABSORPTION COEFFICIENTS 7 TEMPERATURES

THETA = 1.00000 13 DENSITIES

DENSITY	1.32019457-02	2.64500330-03	5.29191080-04	1.05713178-04	2.11225370-05	4.22280940-06	7.76157870-07	1.31943770-07
KAPPA(P)	1.20107780+05	2.42304350+05	5.04454260+04	1.88865050+04	6.68261040+03	1.86992010+03	4.20564120+02	8.01368620+01
KAPPA(R)	1.09311023+05	2.50224310+04	5.22401790+03	1.64656560+03	5.09524020+02	1.30334590+02	2.77530830+01	5.16677130+00
DENSITY	2.02388640-08	2.63885710-09	3.10452600-10	3.29856020-11	3.10452650-12			
KAPPA(P)	1.31960036+01	1.76747309+00	2.24067490-01	3.77550520-02	1.75836990-02			
KAPPA(R)	6.50732590-01	1.35560130-01	3.43279290-02	1.87536100-02	1.57422200-02			

THETA = 1.50000 13 DENSITIES

DENSITY	2.42530180-02	4.45473460-03	9.71406070-04	1.94084880-04	3.87941950-05	7.75719360-06	1.42586776-06	2.42394320-07
KAPPA(P)	5.75198160+05	1.31997430+05	3.92191290+04	1.13383258+04	2.93931820+03	6.95543100+02	1.42764290+02	2.59044550+01
KAPPA(R)	1.10004572+05	3.39349970+04	7.28951960+03	1.60547500+03	4.18334740+02	9.60873780+01	1.91378480+01	3.43068520+00
DENSITY	3.72915220-08	4.84790130-09	5.70339210-10	6.05905670-11	5.70339310-12			
KAPPA(P)	4.14264720+00	5.66804460-01	8.60771710-02	2.92472410-02	2.29614630-02			
KAPPA(R)	3.59598020-01	9.19192320-02	2.69135690-02	1.72646540-02	1.55594363-02			

THETA = 2.25000 13 DENSITIES

DENSITY	4.46082700-02	6.92703470-03	1.78418429-03	3.56480150-04	7.12630240-05	1.42504808-05	2.61946640-06	4.45307880-07
KAPPA(P)	3.03528050+05	9.39213100+04	5.12448240+04	2.42211100+04	5.65875340+03	1.17516740+03	2.25367850+02	4.33444638+01
KAPPA(R)	5.67482590+04	3.49841340+04	1.07495263+04	2.34979170+03	5.36251860+02	1.13504369+02	2.15419660+01	3.74442470+00
DENSITY	5.83090490-08	6.90609650-09	1.04779230-09	1.11326944-10	1.04774077-11			
KAPPA(P)	9.06776630+00	3.09020050+00	2.19087500+00	2.13020880+00	1.94365552+00			
KAPPA(R)	5.99716700-01	9.77309480-02	2.84604180-02	1.79202490-02	1.58796640-02			

THETA = 3.40000 13 DENSITIES

DENSITY	8.30330960-02	1.66077470-02	3.31541660-03	6.62215850-04	1.32375760-04	2.64712860-05	4.86584600-06	8.27174650-07
KAPPA(P)	1.56461060+05	7.22846590+04	4.74015390+04	1.93932910+04	4.82320480+03	1.12155110+03	2.98572260+02	1.28269550+02
KAPPA(R)	2.46354040+04	1.77867650+04	1.07866649+04	3.74814350+03	8.96519430+02	1.87155720+02	3.49111740+01	6.00818870+00
DENSITY	1.27208290-07	1.61989410-08	1.47477564-09	1.47834170-10	1.39023977-11			
KAPPA(P)	7.83269540+01	5.96046120+01	1.19714179+01	1.93817350-01	2.32893290-02			
KAPPA(R)	9.49783510-01	1.42785890-01	3.24867810-02	2.32816680-02	2.21679880-02			

THETA = 5.00000 13 DENSITIES

DENSITY	1.49916530-01	2.97348660-02	5.92121270-03	1.18139065-03	2.36021660-04	4.70251040-05	8.10661670-06	1.09645320-06
KAPPA(P)	6.79901030+04	4.51872390+04	3.30071660+04	1.96709650+04	5.98041890+03	1.77562890+03	6.10316680+02	6.70030378+01
KAPPA(R)	1.34561920+04	1.07573112+04	6.56800870+03	3.87939650+03	1.51448380+03	3.77178660+02	6.36208330+01	3.12688720+00

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GREY ABSORPTION COEFFICIENTS    CONTINUED


THETA =        5.00000   CONTINUED

 DENSITY  1.62317160-07  2.10718050-08  2.47637530-09  2.60734120-10  2.32878360-11
KAPPA(P)  1.90550792+00  9.83959650-02  2.99688830-02  2.31952910-02  2.34835290-02
KAPPA(R)  1.61594650-01  4.19498670-02  2.39967230-02  2.21628460-02  2.29400720-02

THETA =        7.00000                     13   DENSITIES

 DENSITY  2.50589250-01  4.96444340-02  9.80193010-03  1.90709532-03  3.28802940-04  5.69607590-05  1.02784618-05  1.70182011-06
KAPPA(P)  5.29784470+04  3.07292390+04  2.04015870+04  9.36667920+03  2.02458080+03  1.44827580+02  1.21989879+01  1.95471790+00
KAPPA(R)  1.83524950+04  9.19167040+03  4.59427790+03  2.56460810+03  9.52339830+02  7.49085430+01  5.08320000+00  5.05307450-01

 DENSITY  2.65059900-07  3.28688690-08  3.65229580-09  3.80403040-10  3.44555900-11
KAPPA(P)  4.97974820-01  1.73000810-01  5.38558630-02  2.82708240-02  2.61475700-02
KAPPA(R)  1.63932420-01  7.45017990-02  3.68417340-02  2.66722390-02  2.56706490-02

THETA =       10.00000                     13   DENSITIES

 DENSITY  4.29705310-01  8.04141610-02  1.38029775-02  2.45468210-03  4.77805410-04  9.43714540-05  1.67938140-05  2.68062690-06
KAPPA(P)  3.16563510+04  2.04565600+04  8.73865470+03  1.70934570+03  3.45794250+02  8.61810210+01  2.35453170+01  6.32694100+00
KAPPA(R)  1.24304495+04  6.27886270+03  3.62149750+03  6.48684820+02  1.11813797+02  2.83951390+01  9.20270040+00  2.59689990+00

 DENSITY  3.96671040-07  4.70215450-08  5.08337810-09  4.96479060-10  4.31236380-11
KAPPA(P)  1.11924834+00  1.86100940-01  5.27993710-02  3.53704690-02  3.53712830-02
KAPPA(R)  4.81035740-01  9.31768470-02  4.08769070-02  3.41019060-02  3.48934200-02
TAPE EDITING IS SUCCESSFUL
THE NUMBER OF GREY SETS EDITED IS   31 THE NUMBER OF GREY SETS REQUESTED IS    -0
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CARD INPUT USED WITH

GREYS

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DIANE GREY TAPE 11/11/67 A.KNOPP  MATERIALS ARE AIR,WET ALLUVIUM,AL,BE,
C,CF2,CH2,C-PHENOLOC,FE,GINA-IRONIC,GRANITE,GROUT,H,H-M-X,LIH,LIMESTONE,
NE,PHENOLIC,PLYCA,PLYFL,WET TUFF,REFRASIL,SEAWATER,S,SHALE,W,XE
    1081201
 DIANE AIR-12A ,12 FREQUENCIES DECEMBER 21,1965 COMBINED WITH AIR-11F
 0.120000+02 0.742000+03
     1102.    0.230000+02
 0.256501+00 0.800000+01 0.677237+01 0.924061+01 0.434821+01 0.613962+01  23  40
 0.914742+01 0.665079+01 0.563093+01 0.872546+01 0.895338+01 0.501413+01  23  41
 0.799319+01 0.112560+02 0.374186+01 0.658701+01 0.135585+02 0.169848+01  23  42
 0.450265+01 0.158611+02-0.446188+00 0.218908+01 0.181637+02-0.204224+01  23  43
-0.685781-01 0.204663+02 0.405465+00 0.100000+02 0.689550+01 0.102140+02  23  44
-0.208363+00 0.677235+01 0.101662+02 0.217646+01 0.674567+01 0.100627+02  23  45
 0.487587+01 0.655066+01 0.983923+01 0.764838+01 0.594792+01 0.904098+01  23  46
 0.101614+02 0.475467+01 0.765827+01 0.121977+02 0.314731+01 0.592050+01  23  47
 0.140188+02 0.149875+01 0.403196+01 0.158198+02 0.192841+00 0.216075+01  23  48
 0.177106+02-0.634672+00 0.511204+00 0.198432+02 0.615186+00 0.100000+02  23  49
 0.840781+01 0.110527+02 0.967186+00 0.818188+01 0.109449+02 0.338272+01  23  50
 0.798034+01 0.106822+02 0.595402+01 0.735410+01 0.100375+02 0.832856+01  23  51
 0.620401+01 0.873409+01 0.102979+02 0.476710+01 0.708984+01 0.120157+02  23  52
 0.339192+01 0.534701+01 0.137490+02 0.231999+01 0.379999+01 0.155999+02  23  53
 0.132568+01 0.258392+01 0.177068+02-0.611176-01 0.105607+01 0.199993+02  23  54
 0.810930+00 0.100000+02 0.943287+01 0.115112+02 0.172770+01 0.922199+01  13   1
 0.112665+02 0.405747+01 0.874546+01 0.107284+02 0.636263+01 0.783562+01  13   2
 0.975916+01 0.836381+01 0.654533+01 0.836716+01 0.101129+02 0.546547+01  13   3
 0.691535+01 0.117972+02 0.445660+01 0.563859+01 0.136535+02 0.313045+01  13   4
 0.437877+01 0.156926+02 0.131816+01 0.270894+01 0.177276+02-0.407684+00  13   5
 0.760632+00 0.198171+02 0.101160+01 0.100000+02 0.104598+02 0.117046+02  13   6
 0.216940+01 0.100103+02 0.112669+02 0.433946+01 0.934230+01 0.105915+02  13   7
 0.637895+01 0.842795+01 0.964324+01 0.819682+01 0.736564+01 0.849002+01  13   8
 0.994456+01 0.613663+01 0.733372+01 0.117761+02 0.445134+01 0.592302+01  13   9
 0.137050+02 0.259037+01 0.418178+01 0.155836+02 0.104437+01 0.234458+01  13  10
 0.175057+02-0.260632+00 0.677329+00 0.196712+02 0.122378+01 0.100000+02  13  11
 0.111393+02 0.117270+02 0.234874+01 0.105745+02 0.112197+02 0.435141+01  13  12
 0.982372+01 0.106687+02 0.624494+01 0.879924+01 0.996039+01 0.807307+01  13  13
 0.734851+01 0.878575+01 0.993804+01 0.561925+01 0.731333+01 0.117394+02  13  14
 0.410667+01 0.564420+01 0.135253+02 0.286733+01 0.408699+01 0.154026+02  13  15
 0.142332+01 0.254677+01 0.174443+02-0.225558+00 0.768713+00 0.195869+02  13  16
 0.160944+01 0.100000+02 0.114442+02 0.117443+02 0.237513+01 0.107682+02  13  17
 0.113455+02 0.420567+01 0.962378+01 0.108493+02 0.609454+01 0.841519+01  13  18
 0.993068+01 0.793930+01 0.731582+01 0.864760+01 0.971447+01 0.603192+01  13  19
 0.729674+01 0.114913+02 0.447808+01 0.573506+01 0.133161+02 0.289057+01  13  20
 0.414372+01 0.151668+02 0.123997+01 0.246292+01 0.171861+02-0.322681+00  13  21
 0.604122+00 0.193174+02 0.194591+01 0.100000+02 0.114265+02 0.117610+02  13  22
 0.225997+01  .108168+02 0.113624+02 0.407680+01 0.999578+01 0.109368+02  13  23
 0.591591+01 0.884792+01 0.100398+02 0.773457+01 0.743606+01 0.879815+01  13  24
 0.951794+01 0.604747+01 0.726482+01 0.112662+02 0.453477+01 0.556947+01  13  25
 0.130862+02 0.284065+01 0.387948+01 0.149585+02 0.104261+01 0.222946+01  13  26
 0.169330+02-0.544507+00 0.377063+00 0.190262+02 0.230259+01 0.100000+02  13  27
 0.111417+02 0.116599+02 0.207538+01 0.108107+02 0.112301+02 0.386350+01  13  28
 0.100369+02 0.107940+02 0.568642+01 0.884808+01 0.980386+01 0.748254+01  13  29
 0.751438+01 0.839085+01 0.925347+01 0.592354+01 0.682130+01 0.109896+02  13  30
 0.416475+01 0.513426+01 0.127769+02 0.231054+01 0.329559+01 0.145938+02  13  31
 0.505972+00 0.142208+01 0.164908+02-0.912063+00-0.342011+00 0.185400+02  13  32
 0.270805+01 0.100000+02 0.103499+02 0.113701+02 0.182409+01 0.102216+02  13  33
 0.109903+02 0.358757+01 0.978238+01 0.104193+02 0.537736+01 0.864876+01  13  34
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0.913123+01	0.713833+01	0.705805+01	0.757811+01	0.885435+01	0.522097+01	13	35
0.586422+01	0.105227+02	0.330792+01	0.402849+01	0.122415+02	0.144472+01	13	36
0.215378+01	0.140199+02	-0.188504+00	0.357146+00	0.158930+02	-0.116481+01	13	37
-0.103982+01	0.179334+02	0.311352+01	0.100000+02	0.922718+01	0.109396+02	13	38
0.146986+01	0.898218+01	0.104330+02	0.321387+01	0.849665+01	0.952396+01	13	39
0.495518+01	0.745352+01	0.799485+01	0.666029+01	0.590100+01	0.626493+01	13	40
0.831132+01	0.419906+01	0.456534+01	0.993846+01	0.241301+01	0.278082+01	13	41
0.116395+02	0.634242+00	0.966661+00	0.134129+02	-0.845557+00	-0.678550+00	13	42
0.152850+02	-0.167660+01	-0.164791+01	0.173259+02	0.352636+01	0.110000+02	13	43
0.803590+01	0.101886+02	0.101662+01	0.745051+01	0.946126+01	0.273446+01	13	44
0.654284+01	0.821148+01	0.442217+01	0.528069+01	0.662242+01	0.607470+01	13	45
0.383104+01	0.494144+01	0.770556+01	0.231795+01	0.327239+01	0.932348+01	13	46
0.837833+00	0.168089+01	0.110295+02	-0.356589+00	0.399216+00	0.128328+02	13	47
-0.116481+01	-0.611398+00	0.147679+02	-0.151629+01	-0.132617+01	0.168580+02	13	48
-0.159916+01	-0.154720+01	0.192371+02	0.391202+01	0.110000+02	0.732884+01	13	49
0.939175+01	0.534833+00	0.641067+01	0.841827+01	0.221485+01	0.526586+01	13	50
0.718032+01	0.388251+01	0.393636+01	0.580200+01	0.552401+01	0.263748+01	13	51
0.460665+01	0.717576+01	0.142382+01	0.348018+01	0.884869+01	0.296376+00	13	52
0.223158+01	0.100070+02	-0.637079+00	0.922559+00	0.124520+02	-0.130453+01	13	53
-0.430592+00	0.143728+02	-0.155278+01	-0.129597+01	0.164372+02	-0.160512+01	13	54
-0.155735+01	0.187522+02	0.424850+01	0.110000+02	0.734139+01	0.908506+01	13	55
0.807368-01	0.625192+01	0.814114+01	0.175808+01	0.504329+01	0.707234+01	13	56
0.343595+01	0.381969+01	0.596412+01	0.512607+01	0.252132+01	0.479154+01	13	57
0.681394+01	0.122580+01	0.351866+01	0.849528+01	-0.487093-01	0.201756+01	13	58
0.102335+02	-0.100330+01	0.412418+00	0.120270+02	-0.144756+01	-0.898935+00	13	59
0.139055+02	-0.156301+01	-0.147204+01	0.159469+02	-0.159784+01	-0.158334+01	13	60
0.182497+02	0.460517+01	0.110000+02	0.771458+01	0.907600+01	-0.385538+00	13	61
0.600875+01	0.827616+01	0.131961+01	0.535416+01	0.711347+01	0.303207+01	13	62
0.392087+01	0.578249+01	0.472798+01	0.231921+01	0.430429+01	0.639034+01	13	63
0.724033+00	0.273943+01	0.802286+01	-0.532945+00	0.108043+01	0.972468+01	13	64
-0.115367+01	-0.404407+00	0.114995+02	-0.141672+01	-0.130007+01	0.133718+02	13	65
-0.156222+01	-0.155858+01	0.154121+02	-0.160871+01	-0.159603+01	0.177147+02	13	66
0.501064+01	0.110000+02	0.774611+01	0.874798+01	-0.872527+00	0.681442+01	13	67
0.772504+01	0.642410+00	0.543275+01	0.637259+01	0.253456+01	0.370974+01	13	68
0.480155+01	0.418402+01	0.192452+01	0.319553+01	0.580857+01	0.423395+00	13	69
0.159820+01	0.742239+01	-0.586861+00	0.504535-01	0.911793+01	-0.122336+01	13	70
-0.108062+01	0.108915+02	-0.153937+01	-0.151885+01	0.127636+02	-0.160328+01	13	71
-0.158788+01	0.148039+02	-0.161154+01	-0.159639+01	0.171065+02	0.541610+01	13	72
0.110000+02	0.650342+01	0.801177+01	-0.138005+01	0.557203+01	0.673216+01	13	73
0.311508+00	0.428474+01	0.523766+01	0.196204+01	0.274826+01	0.364089+01	13	74
0.358903+01	0.117205+01	0.202089+01	0.520327+01	-0.251208+00	0.466176+00	13	75
0.681491+01	-0.118191+01	-0.856206+00	0.850991+01	-0.152739+01	-0.145814+01	13	76
0.102834+02	-0.160054+01	-0.157639+01	0.121554+02	-0.161189+01	-0.159348+01	13	77
0.141957+02	-0.161339+01	-0.159571+01	0.164983+02	0.582895+01	0.110000+02	13	78
0.468747+01	0.664161+01	-0.193037+01	0.361921+01	0.552972+01	-0.271855+00	13	79
0.224161+01	0.400525+01	0.135653+01	0.764918+00	0.242780+01	0.297263+01	13	80
-0.525141+00	0.850862+00	0.458555+01	-0.124661+01	-0.547886+00	0.619623+01	13	81
-0.152822+01	-0.136313+01	0.789093+01	-0.160391+01	-0.156949+01	0.966409+01	13	82
-0.161869+01	-0.160276+01	0.115362+02	-0.162102+01	-0.160774+01	0.135764+02	13	83
-0.162130+01	-0.160838+01	0.158790+02	0.621461+01	0.110000+02	0.322939+01	13	84
0.586630+01	-0.246805+01	0.198888+01	0.448949+01	-0.838755+00	0.555154+00	13	85
0.296515+01	0.782076+00	-0.651724+00	0.136695+01	0.239480+01	-0.128905+01	13	86
-0.116127+00	0.400752+01	-0.152868+01	-0.116519+01	0.561832+01	-0.160568+01	13	87
-0.153216+01	0.731268+01	-0.162687+01	-0.160666+01	0.908560+01	-0.163084+01	13	88
-0.161814+01	0.109577+02	-0.163147+01	-0.161988+01	0.129979+02	-0.163156+01	13	89

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-0.162011+01 0.153005+02 0.655108+01 0.900000+01-0.151621+01-0.873025+00  13  90
 0.350288+01-0.160659+01-0.147109+01 0.511375+01-0.163312+01-0.160920+01  13  91
 0.680819+01-0.163939+01-0.163288+01 0.858089+01-0.164053+01-0.163681+01  13  92
 0.104530+02-0.164072+01-0.163744+01 0.124932+02-0.164074+01-0.163752+01  13  93
 0.147958+02-0.164075+01-0.163753+01 0.170984+02-0.164075+01-0.163753+01  13  94
 0.194010+02 0.690776+01 0.900000+01-0.160157+01-0.130573+01 0.296873+01  13  95
-0.163606+01-0.158007+01 0.457909+01-0.164574+01-0.164112+01 0.627337+01  13  96
-0.164702+01-0.164951+01 0.804508+01-0.164823+01-0.165895+01 0.991795+01  13  97
-0.164830+01-0.165117+01 0.119582+02-0.164831+01-0.165120+01 0.142608+02  13  98
-0.164831+01-0.165120+01 0.165634+02-0.164831+01-0.165121+01 0.188660+02  13  99
 0.731322+01 0.900000+01-0.163773+01-0.151007+01 0.236079+01-0.165039+01  13 100
-0.162730+01 0.397079+01-0.165394+01-0.165173+01 0.[illegible]21+01-0.165406+01  13 101
-0.165575+01 0.743700+01-0.165417+01-0.165645+01 0.430475+01-0.165419+01  13 102
-0.165656+01 0.113500+02-0.165420+01-0.165657+01 0.136526+02-0.165420+01  13 103
-0.165657+01 0.[illegible]+02-0.165420+01-0.165650+01 0.182570+02 0.771000+01  13 104
 0.900000+01-0.164001+01-0.163322+01 0.175322+01-0.165539+01-0.165530+01  13 105
 0.356500+01-0.165433+01-0.165093+01 0.505714+01-0.165454+01-0.165998+01  13 106
 0.682940+01-0.165458+01-0.166016+01 0.870155+01-0.165459+01-0.166019+01  13 107
 0.107410+02-0.165459+01-0.166019+01 0.130444+02-0.165459+01-0.166019+01  13 108
 0.153470+02-0.165459+01-0.166019+01 0.176496+02 0.          0.            13 109
        55
DIANE/SCAT  ALLUVIUM-1D  INPUT TAPES(4407,2686,3903)  11-7-67  CI/LN
 .1000000+01 .9040000+03
  1130.      .2400000+02                                                   1   0
 .4054651-00 .1300000+02 .1210211+02 .1314954+02 .1386008+01 .1175560+02   1   1
 .1275456+02 .3530033+01 .1108417+02 .1242574+02 .5814212+01 .9074235+01   1   2
 .1149859+02 .7995498+01 .8519470+01 .1006115+02 .1016543+02 .7025324+01   1   3
 .8459766+01 .1217246+02 .5360603+01 .6788169+01 .1407134+02 .3403782+01   1   4
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 .8840741+01 .9672305+01 .9870285+01 .7099316+01 .7957113+01 .1166060+02   1  17
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 .1293604+02 .2403592+01 .1231833+02 .1253555+02 .4187738+01 .1155922+02   1  22
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 .5632960+01 .1315388+02 .2908432+01 .3740539+01 .1498081+02 .1060812+01   1  25
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-.2287573+01 .2594747+02 .1945910+01 .1300000+02 .1224830+02 .1262534+02   1  28
 .2225420+01 .1194923+02 .1226007+02 .3994367+01 .1120027+02 .1169274+02   1  29
 .5804269+01 .9833086+01 .1041055+02 .7586187+01 .7929054+01 .8711154+01   1  30
 .9336194+01 .6130140+01 .6930402+01 .1103588+02 .4347941+01 .5149097+01   1  31
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.1659324+02	-.9862258-00	-.1465331-00	.1870001+02	-.1888769+01	-.1570571+01	1	33
.2090921+02	-.2101083+01	-.2044187+01	.2323640+02	-.2131185+01	-.2110061+01	1	34
.2562890+02	.2302585+01	.1300000+02	.1170343+02	.1226826+02	.1963387+01	1	35
.1143195+02	.1189851+02	.3718366+01	.1056387+02	.1125126+02	.5501988+01	1	36
.9112231+01	.9922271+01	.7253751+01	.7415001+01	.8248817+01	.8985313+01	1	37
.5700462+01	.6551893+01	.1066575+02	.3937263+01	.4819458+01	.1246439+02	1	38
.2176885+01	.3110415+01	.1432079+02	.3762539-00	.1388695+01	.1627591+02	1	39
-.1181711+01	-.4068141-00	.1835592+02	-.1884034+01	-.1640715+01	.2052657+02	1	40
-.2048457+01	-.2007835+01	.2276824+02	-.2049946+01	-.2031899+01	.2517727+02	1	41
.2708050+01	.1300000+02	.1134192+02	.1181819+02	.1641854+01	.1095877+02	1	42
.1146373+02	.3365440+01	.1010585+02	.1070194+02	.5125315+01	.8761507+01	1	43
.9337534+01	.6867236+01	.7062040+01	.7657921+01	.8602844+01	.5250327+01	1	44
.5932398+01	.1031083+02	.3340427+01	.4142652+01	.1206925+02	.1478883+01	1	45
.2362528+01	.1387623+02	-.1919291-00	.5811237-00	.1577825+02	-.1431115+01	1	46
-.1012316+01	.1784606+02	-.1866598+01	-.1789665+01	.2001462+02	-.1953972+01	1	47
-.1935334+01	.2228227+02	-.1947453+01	-.1929238+01	.2467445+02	.3113515+01	1	48
.1300000+02	.1098916+02	.1144400+02	.1261368+01	.1061131+02	.1106011+02	1	49
.2991522+01	.9747717+01	.1012001+02	.4742370+01	.8244655+01	.8633336+01	1	50
.6475829+01	.6378948+01	.6943619+01	.8173862+01	.4559463+01	.5218984+01	1	51
.9834085+01	.2797926+01	.3493451+01	.1156407+02	.1000487+01	.1792777+01	1	52
.1336855+02	-.5893570-00	.9913234-01	.1527216+02	-.1505219+01	-.1245235+01	1	53
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.1753163-01	.8216487+01	.8743660+01	.1710021+01	.7265253+01	.7671065+01	1	70
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.6747455+01	.2477108+01	.3476667+01	.8412590+01	.8232877-00	.1947750+01	1	72
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.6795537+01	-.6919564-00	.3753074-02	.8507845+01	-.1340493+01	-.1035070+01	1	93
.1029057+02	-.1552393+01	-.1482490+01	.1216533+02	-.1598513+01	-.1578134+01	1	94
.1420608+02	-.1608418+01	-.1591388+01	.1634621+02	-.1611149+01	-.1592988+01	1	95
.1858818+02	-.1611536+01	-.1593160+01	.2095139+02	.5828946+01	.1300000+02	1	96
.6339476+01	.7234829+01	-.1990469+01	.5376227+01	.5972272+01	-.3278895-00	1	97
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.1141583+01	.2002037+01	.4589762+01	-.2459725-00	.5381392-00	.6206706+01	1	99
-.1112121+01	-.7332440-00	.7902436+01	-.1453177+01	-.1384703+01	.9674783+01	1	100
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.2659306+01	.3667233+01	-.1868764+01	.1308040+01	.2163157+01	-.2467266-00	1	118
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-.1339098+01	-.5142927-00	-.2071688+01	-.1538860+01	-.1288303+01	-.4608924-00	1	139
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	140
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 0.116710+02-0.110551+02-0.861636+01 0.128223+02-0.110551+02-0.861637+01  13  16
 0.139736+02-0.110551+02-0.861639+01 0.151248+02-0.110552+02-0.861642+01  13  17
 0.162761+02-0.110552+02-0.861647+01 0.174274+02-0.120397+01 0.170000+02  13  18
-0.189337+01 0.157409+00-0.993252+00-0.189337+01 0.157407+00 0.158041+00  13  19
-0.189337+01 0.157404+00 0.130933+01-0.189338+01 0.157398+00 0.246063+01  13  20
-0.189339+01 0.157387+00 0.361192+01-0.189341+01 0.157368+00 0.476321+01  13  21
-0.189344+01 0.157334+00 0.591450+01-0.189350+01 0.157274+00 0.706580+01  13  22
-0.189361+01 0.157167+00 0.821709+01-0.189380+01 0.156977+00 0.936838+01  13  23
-0.189414+01 0.156639+00 0.105197+02-0.189474+01 0.156038+00 0.116710+02  13  24
-0.189581+01 0.154968+00 0.128223+02-0.189771+01 0.153067+00 0.139736+02  13  25
-0.190109+01 0.149686+00 0.151248+02-0.190710+01 0.143674+00 0.162761+02  13  26
-0.191779+01 0.132983+00 0.174274+02-0.916291+00 0.170000+02 0.251757+01  13  27
 0.428976+01-0.993252+00 0.251754+01 0.428973+01 0.158041+00 0.251749+01  13  28
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0.428968+01	0.130933+01	0.251740+01	0.428959+01	0.246063+01	0.251724+01	13	29
0.428943+01	0.361192+01	0.251696+01	0.428914+01	0.476321+01	0.251645+01	13	30
0.428864+01	0.591450+01	0.251555+01	0.428773+01	0.706580+01	0.251394+01	13	31
0.428613+01	0.821709+01	0.251109+01	0.428327+01	0.936838+01	0.250601+01	13	32
0.427820+01	0.105197+02	0.249698+01	0.426917+01	0.116710+02	0.248093+01	13	33
0.425312+01	0.128223+02	0.245239+01	0.422458+01	0.139736+02	0.240167+01	13	34
0.417386+01	0.151248+02	0.231169+01	0.408388+01	0.162761+02	0.215281+01	13	35
0.392500+01	0.174274+02	-0.693147+00	0.170000+02	0.506289+01	0.661751+01	13	36
-0.993252+00	0.500274+01	0.661736+01	0.158041+00	0.506247+01	0.661709+01	13	37
0.130933+01	0.506199+01	0.661662+01	0.246063+01	0.506115+01	0.661577+01	13	38
0.361192+01	0.505964+01	0.661426+01	0.476321+01	0.505696+01	0.661158+01	13	39
0.591450+01	0.505220+01	0.660682+01	0.706580+01	0.504373+01	0.659835+01	13	40
0.821709+01	0.502666+01	0.658328+01	0.936838+01	0.500180+01	0.655650+01	13	41
0.105197+02	0.495428+01	0.650890+01	0.116710+02	0.486981+01	0.642443+01	13	42
0.128223+02	0.472053+01	0.627515+01	0.139736+02	0.446013+01	0.601475+01	13	43
0.151248+02	0.402217+01	0.557680+01	0.162761+02	0.334615+01	0.490077+01	13	44
0.174274+02	-0.510826+00	0.170000+02	0.669312+01	0.806848+01	-0.993252+00	13	45
0.669266+01	0.806801+01	0.158041+00	0.669182+01	0.806718+01	0.130933+01	13	46
0.669034+01	0.806570+01	0.246063+01	0.668771+01	0.806307+01	0.361192+01	13	47
0.668303+01	0.805838+01	0.476321+01	0.667470+01	0.805006+01	0.591450+01	13	48
0.665969+01	0.803525+01	0.706580+01	0.663357+01	0.800892+01	0.821709+01	13	49
0.658678+01	0.796214+01	0.936838+01	0.650374+01	0.787910+01	0.105197+02	13	50
0.635697+01	0.773233+01	0.116710+02	0.610077+01	0.747613+01	0.128223+02	13	51
0.566917+01	0.704453+01	0.139736+02	0.500064+01	0.637599+01	0.151248+02	13	52
0.410046+01	0.547582+01	0.162761+02	0.305153+01	0.442688+01	0.174274+02	13	53
-0.356675+00	0.179000+02	0.781161+01	0.903271+01	-0.993252+00	0.781053+01	13	54
0.903104+01	0.158041+00	0.780863+01	0.902973+01	0.130933+01	0.780524+01	13	55
0.902035+01	0.246063+01	0.779921+01	0.902032+01	0.361192+01	0.778850+01	13	56
0.900960+01	0.476321+01	0.776944+01	0.899055+01	0.591450+01	0.773556+01	13	57
0.895067+01	0.706580+01	0.767538+01	0.889649+01	0.821709+01	0.756871+01	13	58
0.870981+01	0.936838+01	0.738088+01	0.860199+01	0.105197+02	0.705674+01	13	59
0.827785+01	0.116710+02	0.652648+01	0.774759+01	0.128223+02	0.574996+01	13	60
0.697108+01	0.139736+02	0.477249+01	0.599362+01	0.151248+02	0.368666+01	13	61
0.490784+01	0.162761+02	0.255705+01	0.377898+01	0.174274+02	-0.223144+00	13	62
0.170000+02	0.861979+01	0.970210+01	-0.993252+00	0.861777+01	0.970008+01	13	63
0.158041+00	0.861417+01	0.969648+01	0.130933+01	0.860778+01	0.969009+01	13	64
0.246063+01	0.859642+01	0.967072+01	0.361192+01	0.857621+01	0.965852+01	13	65
0.476321+01	0.854028+01	0.962259+01	0.591450+01	0.847647+01	0.955878+01	13	66
0.706580+01	0.836340+01	0.944571+01	0.821709+01	0.816456+01	0.924687+01	13	67
0.936838+01	0.782260+01	0.890492+01	0.105197+02	0.726789+01	0.835023+01	13	68
0.116710+02	0.646729+01	0.754968+01	0.128223+02	0.547464+01	0.655719+01	13	69
0.139736+02	0.438238+01	0.546543+01	0.151248+02	0.325150+01	0.433620+01	13	70
0.162761+02	0.210890+01	0.319074+01	0.174274+02	-0.105361+00	0.170000+02	13	71
0.922005+01	0.101791+02	-0.993252+00	0.922470+01	0.101758+02	0.158041+00	13	72
0.921076+01	0.101698+02	0.130933+01	0.920018+01	0.101592+02	0.246063+01	13	73
0.918937+01	0.101404+02	0.361192+01	0.915594+01	0.101070+02	0.476321+01	13	74
0.909653+01	0.100476+02	0.591450+01	0.899123+01	0.994229+01	0.706580+01	13	75
0.880577+01	0.975684+01	0.821709+01	0.848550+01	0.943658+01	0.936838+01	13	76
0.796063+01	0.891179+01	0.105197+02	0.718970+01	0.814107+01	0.116710+02	13	77
0.621623+01	0.716836+01	0.128223+02	0.513336+01	0.608800+01	0.139736+02	13	78
0.400890+01	0.497170+01	0.151248+02	0.287781+01	0.386607+01	0.162761+02	13	79
0.178148+01	0.264187+01	0.174274+02	0.	0.110000+02	0.912861+01	13	80
0.108095+02	0.176672+01	0.885818+01	0.106592+02	0.391134+01	0.864614+01	13	81
0.104399+02	0.633086+01	0.804194+01	0.985268+01	0.863581+01	0.691048+01	13	82
0.873944+01	0.105922+02	0.552787+01	0.715080+01	0.123093+02	0.380251+01	13	83

0.541120+01	0.140326+02	0.215203+01	0.373631+01	0.158297+02	0.877637+00	13	84
0.236627+01	0.170086+02	-0.349232+00	0.120964+01	0.201586+02	-0.193164+01	13	85
-0.514940+00	0.225071+02	0.405465+00	0.110000+02	0.107678+02	0.113087+02	13	86
0.255294+01	0.103602+02	0.108590+02	0.462561+01	0.978546+01	0.102489+02	13	87
0.664435+01	0.887308+01	0.944754+01	0.645796+01	0.774492+01	0.849814+01	13	88
0.101768+02	0.665325+01	0.743676+01	0.119596+02	0.535273+01	0.614373+01	13	89
0.134210+02	0.363740+01	0.453302+01	0.158482+02	0.175139+01	0.265441+01	13	90
0.177734+02	-0.102039+00	0.875008+00	0.194077+02	-0.173683+01	-0.717144+00	13	91
0.222461+02	0.810930+00	0.110000+02	0.107791+02	0.112408+02	0.261864+01	13	92
0.104250+02	0.108084+02	0.453377+01	0.992670+01	0.104424+02	0.638693+01	13	93
0.932835+01	0.100015+02	0.824179+01	0.839139+01	0.897697+01	0.100816+02	13	94
0.705540+01	0.752217+01	0.116283+02	0.551833+01	0.690197+01	0.136630+02	13	95
0.369919+01	0.439601+01	0.155793+02	0.165343+01	0.251176+01	0.175432+02	13	96
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0.122370+01	0.110000+02	0.104727+02	0.111251+02	0.243974+01	0.103570+02	13	98
0.107570+02	0.429577+01	0.101564+02	0.104808+02	0.616727+01	0.455358+01	13	99
0.993107+01	0.801125+01	0.836096+01	0.871519+01	0.981468+01	0.672837+01	13	100
0.705948+01	0.115471+02	0.483803+01	0.519483+01	0.132850+02	0.287710+01	13	101
0.327955+01	0.150070+02	0.841908+00	0.131857+01	0.169407+02	-0.107382+01	13	102
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0.110000+02	0.953771+01	0.108236+02	0.21[illegible]+01	0.437209+01	0.104508+02	13	104
0.402104+01	0.901274+01	0.100294+02	0.547[illegible]+01	0.820133+01	0.910447+01	13	105
0.747373+01	[illegible]	[illegible]	0.937720+01	0.530870+01	[illegible]	13	106
0.110161+02	0.355170+01	0.402[illegible]+01	0.127171+02	0.17[illegible]+01	0.214503+01	13	107
0.14[illegible]+02	-0.1[illegible]+00	0.2[illegible]+00	0.1[illegible]+02	-0.1[illegible]+01	-0.161013+01	13	108
0.184102+02	-0.270674+01	-0.2[illegible]+01	0.209457+02	0.1[illegible]+01	0.110000+02	13	109
0.837490+01	0.182573+02	0.10[illegible]+01	0.797170+01	0.[illegible]+01	0.30[illegible]+01	13	110
0.733602+01	0.911100+01	[illegible]	0.[illegible]+01	0.7[illegible]+01	0.72[illegible]+01	13	111
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-0.243992+01	-0.228522+01	0.204021+02	0.230259+01	0.110000+02	0.746489+01	13	115
0.964173+01	0.144440+01	0.688248+01	0.910323+01	0.323944+01	0.617743+01	13	116
0.844622+01	0.502012+01	0.543992+01	0.747719+01	0.675618+01	0.472589+01	13	117
0.630416+01	0.847528+01	0.381706+01	0.517973+01	0.102024+02	0.261352+01	13	118
0.363932+01	0.119616+02	0.126672+01	0.203326+01	0.138488+02	-0.281246+00	13	119
0.431166+00	0.158149+02	-0.163719+01	-0.111158+01	0.179327+02	-0.223259+01	13	120
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0.463410+01	0.593615+01	0.767083+01	0.641086+01	0.507267+01	0.645823+01	13	123
0.816397+01	0.399293+01	0.514319+01	0.988682+01	0.273016+01	0.369022+01	13	124
0.116629+02	0.125042+01	0.210638+01	0.135458+02	-0.346491+00	0.483822+00	13	125
0.155069+02	-0.153974+01	-0.102302+01	0.176295+02	-0.199106+01	-0.183983+01	13	126
0.198539+02	0.311352+01	0.110000+02	0.821171+01	0.958877+01	0.759898+00	13	127
0.749622+01	0.911737+01	0.252660+01	0.684812+01	0.866268+01	0.429702+01	13	128
0.610949+01	0.775580+01	0.607646+01	0.523751+01	0.659806+01	0.783781+01	13	129
0.412076+01	0.519228+01	0.956704+01	0.271060+01	0.373437+01	0.113633+02	13	130
0.115136+01	0.231574+01	0.132279+02	-0.369112+00	0.641066+00	0.151861+02	13	131
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.7787571+01	.5776938+01	.5453395+01	.6463332+01	.7507806+01	.4071800+01	1	3
.5049347+01	.9221748+01	.2443169+01	.3418635+01	.1100860+02	.7459965-00	1	4
.1807118+01	.1285621+02	-.7569452-00	.1273043-00	.1477228+02	-.1568049+01	1	5
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-.89636      .507721 +01
         52
DIANE/SCAT  AL-108  TEMP(1.-7000.EV) 10 FREQ.  C1/WBL  10-26-67
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 .1168822+02 .1220257+02 .6397773+01 .1063094+02 .1163549+02 .82[illegible]+01   1  16
 .9142246+01 .1023063+02 .1008903+02 .7532120+01 .8478715+01 .1183569+02   1  17
 .5894359+01 .6646185+01 .1367044+02 .3962561+01 .4743305+01 .1560681+02   1  18
 .1799787+01 .2716690+01 .1755066+02-.3553870-00 .5796457-00 .1960568+02   1  19
-.2043833+01-.1445498+01 .2174780+02-.2856938+01-.2736443+01 .2399001+02   1  20
-.3073784+01-.3059123+01 .2635325+02 .1223775+01 .1300000+02 .1149990+02   1  21
 .1283535+02 .2557746+01 .1142088+02 .1244391+02 .4349987+01 .1113270+02   1  22
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.1215277+02	.6173363+01	.1029262+02	.1118308+02	.8018731+01	.8855043+01	1	23
.9540496+01	.9822137+01	.7040954+01	.7543500+01	.1155452+02	.5028889+01	1	24
.5441808+01	.1329247+02	.3001842+01	.3448607+01	.1507451+02	.9726370-00	1	25
.1462758+01	.1694818+02	-.1005719+01	-.5715810-00	.1898870+02	-.2418450+01	1	26
-.2267464+01	.2112681+02	-.2981652+01	-.2477309+01	.2337078+02	-.3101163+01	1	27
-.3090367+01	.2573406+02	.1609438+01	.1300000+02	.1035233+02	.1219782+02	1	28
.2348148+01	.1011088+02	.1145614+02	.4064491+01	.9623814+01	.1129851+02	1	29
.5888794+01	.8672425+01	.9901998+01	.7681191+01	.7263400+01	.5007959+01	1	30
.9384661+01	.5612365+01	.6121974+01	.1102353+02	.3801644+01	.4214512+01	1	31
.1272454+02	.1914285+01	.2295031+01	.1449808+02	.8081138-02	.3367015-00	1	32
.1637098+02	-.1707671+01	-.1495601+01	.1841769+02	-.2661687+01	-.2554718+01	1	33
.2060314+02	-.2839816+01	-.2792889+01	.2298754+02	-.2029816+01	-.2811204+01	1	34
.2543254+02	.1945910+01	.1300000+02	.9622778+01	.1158664+02	.2082951+0[illegible]	1	35
.9073923+01	.1106009+02	.3751794+01	.8299064+01	.1022562+02	.5532230+01	1	36
.7070419+01	.6619016+01	.7239129+01	.5696446+01	.6863161+01	.8901340+01	1	37
.4252148+01	.5166023+01	.1052867+02	.2855795+01	.3505526+01	.1224442+02	1	38
.1554918+01	.2040971+01	.1409092+02	.4071418-01	.5800058-00	.1608749+02	1	39
-.1556618+01	-.1092964+01	.1819545+02	-.2409115+01	-.2202384+01	.2040954+02	1	40
-.2579091+01	-.2528679+01	.2276279+02	-.2584941+01	-.2568091+01	.2517510+02	1	41
.2302585+01	.1300000+02	.9299765+01	.1181135+02	.1699857+01	.8414779+01	1	42
.1110850+02	.3370640+01	.7604290+01	.1002824+02	.5075177+01	.6652053+01	1	43
.8632464+01	.6763387+01	.5736277+01	.7173874+01	.3484427+01	.4568282+01	1	44
.5752167+01	.1021139+02	.3058530+01	.4077267+01	.1198959+02	.1489258+01	1	45
.2349694+01	.1385635+02	-.1736517-00	.6459718-00	.1582242+02	-.1595218+01	1	46
-.9775290-00	.1794022+02	-.2218532+01	-.2028122+01	.2017524+02	-.2347735+01	1	47
-.2311216+01	.2248151+02	-.2294470+01	-.2278186+01	.2493289+02	.2708050+01	1	48
.1300000+02	.9811734+01	.1235528+02	.1255211+01	.9084348+01	.1186459+02	1	49
.2929224+01	.8481752+01	.1065329+02	.4692993+01	.7476010+01	.9115460+01	1	50
.6446585+01	.6051546+01	.7368356+01	.8183425+01	.4496820+01	.5594187+01	1	51
.9898156+01	.2968815+01	.3934326+01	.1169145+02	.1358307+01	.2269295+01	1	52
.1355445+02	-.2898158-00	.5886757-00	.1551600+02	-.1525058+01	-.9459983-00	1	53
.1763843+02	-.1989986+01	-.1820266+01	.1986235+02	-.2053304+01	-.2022278+01	1	54
.2217665+02	-.2006411+01	-.1941406+01	.2461438+02	.3113515+01	.1300000+02	1	55
.1076381+02	.1234404+02	.9242303-00	.1009320+02	.1163902+02	.2610191+01	1	56
.9200569+01	.1016989+02	.4374608+01	.7565838+01	.8603696+01	.6124216+01	1	57
.5800210+01	.7072053+01	.7863922+01	.4286628+01	.5407723+01	.9582029+01	1	58
.2786390+0[illegible]	.3819370+01	.1137369+02	.1178624+01	.2367638+01	.1323625+02	1	59
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.3467871+01	.1101864+02	.7597066-00	.1827897+01	.1286429+02	-.7528578-00	1	66
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.7154305+01	.3446578+01	.4306362+01	.8835517+01	.1566797+01	.2552580+01	1	72
.1856148+02	-.1478621-00	.7441965-00	.1234176+02	-.1259506+01	-.7395426-00	1	73
.1421514+02	-.1675283+01	-.1588701+01	.1625562+02	-.1783468+01	-.1777048+01	1	74
.1839572+02	-.1812956+01	-.1801078+01	.2063768+02	-.1817295+01	-.1803673+01	1	75
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.8679928+01	.1219619+01	.6286433+01	.7366644+01	.2925017+01	.4942032+01	1	84
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.2260639+01	.7836175+01	.5043915-01	.6050262-00	.9531629+01	-.1066558+01	1	86
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-.1693035+01	.1970405+02	-.1665538+01	-.1648582+01	.2211572+02	.5010635+01	1	89
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.6959980-00	.4399908+01	.6076127+01	.2363647+01	.2965110+01	.4396089+01	1	91
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.7238616+01	-.7479826-00	.3562856-00	.8960434+01	-.1364988+01	-.5525871-00	1	93
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-.1647983+01	-.1628200+01	.1630666+02	-.1650027+01	-.1629589+01	.1854862+02	1	102
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          7
DIANE/SCAT  BE(HI/LO)-2 10 FREQ. TEMP(1.-2250.)  CI/JP  12-9-66   000006
 .1000000+02 .8610000+03
     1004. .2100000E+02
 .0000000    .1300000+02 .1120797+02 .1225239+02 .1817634+01 .1110633+02   1   1
 .1218590+02 .3993325+01 .1094825+02 .1199585+02 .6547831+01 .1052811+02   1   2
 .1165585+02 .9155944+01 .9549431+01 .1060220+02 .1145886+02 .7943660+01   1   3
 .8855362+01 .1334956+02 .5979154+01 .6997883+01 .1512141+02 .4015629+01   1   4
 .5201925+01 .1691895+02 .2354369+01 .3561411+01 .1885130+02 .9470235-00   1   5
 .2228171+01 .2113898+02-.6417287-00 .6746542-00 .2356899+02-.1886346+01   1   6
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 .1300000+02 .1268564+02 .1303914+02 .3304670+01 .1241557+02 .1273884+02   1   8
 .5381821+01 .1163673+02 .1233191+02 .7561255+01 .1074342+02 .1163475+02   1   9
 .9490022+01 .9380473+01 .1031799+02 .1122901+02 .7981574+01 .8902133+01   1  10
 .1295905+02 .6484169+01 .7424938+01 .1490002+02 .4706212+01 .5752500+01   1  11
 .1690217+02 .2671414+01 .3856456+01 .1885055+02 .5484357-00 .1780483+01   1  12
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 .1573675+01 .2650190+01 .1825844+02-.3755846-00 .5765313-00 .2029900+02   1  19
-.1715596+01-.1289627+01 .2243911+02-.2241056+01-.2213466+01 .2468108+02   1  20
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 .5242396+01 .1399425+02 .2808336+01 .3365830+01 .1276749+02 .8670880-00   1  25
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.1706105+02	-.1704313+01	-.1345231+01	.1910129+02	-.2282687+01	-.2202374+01	1	33
.2124139+02	-.2409045+01	-.2384154+01	.2348366+02	-.2421131+01	-.2402032+01	1	34
.2585018+02	.1945910+01	.1300000+02	.8962691+01	.1154172+02	.2086789+01	1	35
.6123342+01	.1062299+02	.4570132+01	.7091598+01	.9556583+01	.6290296+01	1	36
.5788412+01	.8095816+01	.7963156+01	.4335203+01	.6439996+01	.9600912+01	1	37
.2802656+01	.4747963+01	.1121704+02	.1206059+01	.2992756+01	.1291236+02	1	38
-.2689678-00	.1217446+01	.1466508+02	-.1368610+01	-.4612911-00	.1656004+02	1	39
-.2013568+01	-.1573060+01	.1862323+02	-.2160202+01	-.1902212+01	.2088788+02	1	40
-.2061069+01	-.1983516+01	.2332230+02	-.2025011+01	-.2000063+01	.2574097+02	1	41
.2302505+01	.1300000+02	.8012773+01	.1089769+02	.2422371+01	.7003243+01	1	42
.9858483+01	.4088954+01	.5848217+01	.8568297+01	.5779189+01	.4498615+01	1	43
.7111149+01	.7436405+01	.3100603+01	.5596709+01	.9070758+01	.1869371+01	1	44
.4174138+01	.1069575+02	.1017652+01	.3051035+01	.1243880+02	.2634995-00	1	45
.2175162+01	.1435544+02	-.7806009-00	.8724764-00	.1637442+02	-.1620614+01	1	46
-.7165070-00	.1846501+02	-.1898668+01	-.1610816+01	.2064876+02	-.1927719+01	1	47
-.1744798+01	.2302719+02	-.1747106+01	-.1720694+01	.2548419+02	.2708050+01	1	48
.1300000+02	.7368834+01	.1003923+02	.1858524+01	.6422863+01	.9460926+01	1	49
.3570504+01	.5383211+01	.8485695+01	.5234721+01	.4565944+01	.7440086+01	1	50
.6917149+01	.3786768+01	.6437063+01	.8682122+01	.2635593+01	.5188409+01	1	51
.1042438+02	.1365566+01	.3727079+01	.1218825+02	.3419087-00	.2378167+01	1	52
.1405095+02	-.7075832-00	.1017491+01	.1604569+02	-.1450052+01	-.5547144-00	1	53
.1813685+02	-.1691659+01	-.1480665+01	.2028541+02	-.1727797+01	-.1687253+01	1	54
.2252842+02	-.1731848+01	-.1712302+01	.2489174+02	.3113515+01	.1300000+02	1	55
.8310048+01	.1061430+02	.1410869+01	.7504452+01	.1015099+02	.3105112+01	1	56
.6621957+01	.9062373+01	.4868752+01	.5499829+01	.7763172+01	.6624582+01	1	57
.4267336+01	.6454096+01	.8347537+01	.2927645+01	.5148838+01	.1007386+02	1	58
.1347382+01	.3614620+01	.1183302+02	-.2582419-00	.1907479+01	.1362240+02	1	59
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-.1694535+01	-.1640000+01	.1967030+02	-.1723844+01	-.1708478+01	.2192035+02	1	61
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	62
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	63
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	64
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	65
.2432302+01	.1123415+02	-.8270954-00	.7220613-00	.1300007+02	-.1333415+01	1	66
-.7652350-00	.1407801+02	-.1606200+01	-.1551015+01	.1691905+02	-.1701602+01	1	67
-.1692659+01	.1905912+02	-.1706514+01	-.1694670+01	.2130108+02	-.1706781+01	1	68
-.1700206+01	.2366429+02	.3912023+01	.1300000+02	.9115052+01	.1024072+02	1	69
.6065458-00	.8389852+01	.9364286+01	.2337080+01	.7125858+01	.8037130+01	1	70
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.7349453+01	.1702169+01	.3071482+01	.8961991+01	.1717367-00	.1391040+01	1	72
.1065643+02	-.8067268-00	-.2198786-00	.1242851+02	-.1487678+01	-.1348741+01	1	73
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.1848063+02	-.1671596+01	-.1672592+01	.2072259+02	-.1671699+01	-.1672808+01	1	75
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.4182816+01	.5264006+01	.5231267+01	.2533360+01	.3652411+01	.6846983+01	1	78
.9044832-00	.2006058+01	.8457749+01	-.5435062-00	.3796611-00	.1015181+02	1	79
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.1669240+02-.1097660+01-.3103800-00 .1899580+02 .2302590+01 .1200000+02   1 125
.1049560+02 .1136590+02 .2105180+01 .1047680+02 .1127460+02 .3196210+01   1 126
.1042600+02 .1121240+02 .4013830+01 .1020900+02 .1101910+02 .5291390+01   1 127
.9702390+01 .1039600+02 .6661420+01 .8912330+01 .9453090+01 .7481320+01   1 128
.7691350+01 .8164670+01 .9177020+01 .6371760+01 .6932190+01 .1031950+02   1 129
.4870660+01 .5605220+01 .1154330+02 .2238430+01 .3159010+01 .1385470+02   1 130
-.1538510-03 .8333960-00 .1615820+02-.1358980+01-.1070520+01 .1846090+02   1 131
          54
DIANE/SCAT  C-1A  TEMP(1-2250 EV) 11-7-67  SADT INPUT TAPES(1303,1159)
.1000000+01 .8610000+03
     3000.  .2100000+02                                                   1   0
.0000000    .1300000+02 .6606878+01 .9820556+01-.1296147+01 .6764705+01   1   1
.9795294+01 .9102045-00 .6754538+01 .9579939+01 .3544070+01 .6698247+01   1   2
.9587894+01 .6415692+01 .6499031+01 .9101728+01 .9367875+01 .5979535+01   1   3
.8221956+01 .1215713+02 .4857572+01 .6961544+01 .1456576+02 .3188336+01   1   4
.5265691+01 .1650805+02 .1273977+01 .3354430+01 .1848699+02-.7362190-00   1   5
.1264200+01 .2053533+02-.2373932+01-.6353852-00 .2267964+02-.3100166+01   1   6
-.2481413+01 .2495091+02-.3083827+01-.2947838+01 .2751901+02 .4054651-00   1   7
.1300000+02 .9532645+01 .1151485+02 .1218917+01 .9381120+01 .1143385+02   1   8
.3573113+01 .9202302+01 .1121364+02 .6182297+01 .8646091+01 .1070680+02   1   9
.8651143+01 .7466477+01 .9487384+01 .1073897+02 .5902082+01 .7743084+01   1  10
.1250431+02 .4203384+01 .5952477+01 .1424021+02 .2636864+01 .4173534+01   1  11
.1604387+02 .1402289+01 .2673865+01 .1804059+02 .1580685-00 .1382059+01   1  12
.2039951+02-.1407179+01-.3627992-00 .2272434+02-.2417229+01-.1987483+01   1  13
.2499904+02-.2675778+01-.2600041+01 .2736700+02 .8109302-00 .1300000+02   1  14
.1114380+02 .1210130+02 .2434420+01 .1083171+02 .1176496+02 .4638560+01   1  15
.1813846+02 .1114215+02 .4762769+01 .9114142+01 .1015095+02 .8638609+01   1  16
.7884337+01 .8841002+01 .1036561+02 .6650536+01 .7612686+01 .1213190+02   1  17
```

.5168049+01	.6351424+01	.1409586+02	.3311826+01	.4726169+01	.1604508+02	1	18
.1454859+01	.2841439+01	.1796932+02	-.2668597-00	.9061521-00	.2005444+02	1	19
-.1577982+01	-.6863283-00	.2235510+02	-.2109404+01	-.1833993+01	.2476142+02	1	20
-.2273112+01	-.2227664+01	.2716408+02	.1223775+01	.1300000+02	.1183807+02	1	21
.1213252+02	.2693631+01	.1131986+02	.1172617+02	.4647583+01	.1045933+02	1	22
.1135997+02	.6536379+01	.9204761+01	.1064858+02	.8420349+01	.7749817+01	1	23
.9294581+01	.1027071+02	.6333694+01	.7679511+01	.1200990+02	.4984353+01	1	24
.6133920+01	.1382079+02	.3469849+01	.4631637+01	.1576545+02	.1667311+01	1	25
.2872528+01	.1774285+02	-.1370937-00	.9843153-00	.1985577+02	-.1406124+01	1	26
-.6364230-00	.2213738+02	-.1876029+01	-.1696893+01	.2445557+02	-.2000143+01	1	27
-.1967788+01	.2683064+02	.1609438+01	.1300000+02	.1184060+02	.1218059+02	1	28
.2667112+01	.1137215+02	.1184401+02	.4514546+01	.1054995+02	.1146572+02	1	29
.6400813+01	.9605425+01	.1061400+02	.8225306+01	.8274195+01	.9277375+01	1	30
.1002754+02	.6659671+01	.7693746+01	.1179019+02	.5007292+01	.5989510+01	1	31
.1359338+02	.3310538+01	.4351566+01	.1549396+02	.1379474+01	.2566205+01	1	32
.1744552+02	-.5084473-00	.5659338-00	.1950505+02	-.1617564+01	-.1137194+01	1	33
.2164789+02	-.1948238+01	-.1864787+01	.2389018+02	-.2004897+01	-.1986544+01	1	34
.2625343+02	.1945910+01	.1300000+02	.1142945+02	.1211812+02	.2539882+01	1	35
.1128198+02	.1181306+02	.4364768+01	.1074918+02	.1142160+02	.6194824+01	1	36
.9611972+01	.1040160+02	.8013253+01	.8127835+01	.8928677+01	.9784286+01	1	37
.6501690+01	.7233428+01	.1152538+02	.4503240+01	.5481414+01	.1329368+02	1	38
.2409745+01	.3611940+01	.1508663+02	.4438287-00	.1629638+01	.1696250+02	1	39
-.1097663+01	-.3100030-00	.1900339+02	-.1785013+01	-.1591735+01	.2114354+02	1	40
-.1961416+01	-.1949047+01	.2338552+02	-.2011379+01	-.1996123+01	.2574873+02	1	41
.2302585+01	.1300000+02	.1064222+02	.1191699+02	.2330537+01	.1056371+02	1	42
.1160104+02	.4131400+01	.1014951+02	.1099850+02	.5916096+01	.9152111+01	1	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	44
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	45
.2457640+01	.1455602+02	-.2103920-00	.5939492-00	.1642019+02	-.1359048+01	1	46
-.1060668+01	.1846647+02	-.1853921+01	-.1834795+01	.2060854+02	-.1996835+01	1	47
-.1982375+01	.2285050+02	-.2017092+01	-.1949271+01	.2521371+02	.2708050+01	1	48
.1300000+02	.9385840+01	.1138911+02	.2001555+01	.9050773+01	.1084750+02	1	49
.3752512+01	.8395869+01	.9917572+01	.5507390+01	.7273416+01	.8338724+01	1	50
.7209719+01	.5769000+01	.6588700+01	.8859835+01	.4109399+01	.4851636+01	1	51
.1047963+02	.2352331+01	.3068797+01	.1217575+02	.5999711-00	.1270387+01	1	52
.1394817+02	-.8553296-00	-.4420382-00	.1582007+02	-.1701623+01	-.1604256+01	1	53
.1786050+02	-.1968023+01	-.1941415+01	.2000223+02	-.1996946+01	-.1976701+01	1	54
.2225887+02	-.1915920+01	-.1896829+01	.2470812+02	.3113515+01	.1300000+02	1	55
.6203033+01	.1057701+02	.1552197+01	.7511445+01	.9820837+01	.3275192+01	1	56
.6417102+01	.8593470+01	.4963512+01	.5139524+01	.7055435+01	.6625885+01	1	57
.3687101+01	.5383447+01	.8258150+01	.2170084+01	.3713048+01	.9873744+01	1	58
.7111113-00	.2659845+01	.1157247+02	-.4100334-00	.6702279-00	.1336449+02	1	59
-.1169738+01	-.2940714-00	.1531092+02	-.1630370+01	-.1192318+01	.1744716+02	1	60
-.1740547+01	-.1625934+01	.1963685+02	-.1681278+01	-.1643172+01	.2196745+02	1	61
-.1624006+01	-.1603222+01	.2439225+02	.3526360+01	.1300000+02	.7452357+01	1	62
.9754282+01	.1029901+01	.6450446+01	.8717444+01	.2721566+01	.5278575+01	1	63
.7462245+01	.4385560+01	.3962339+01	.6139538+01	.6027883+01	.2828579+01	1	64
.5055593+01	.7693094+01	.1785726+01	.4036041+01	.9389228+01	.6226522-00	1	65
.2766652+01	.1116387+02	-.3606221-00	.1411297+01	.1300922+02	-.1151701+01	1	66
.7125150-01	.1496101+02	-.1518389+01	-.1104599+01	.1703245+02	-.1601215+01	1	67
-.1522474+01	.1917764+02	-.1611621+01	-.1587659+01	.2142023+02	-.1613165+01	1	68
-.1594959+01	.2378351+02	.3912023+01	.1300000+02	.7506998+01	.9549687+01	1	69
.5120196-00	.6494001+01	.8762718+01	.2199301+01	.5447650+01	.7760897+01	1	70
.3901914+01	.4295266+01	.6631862+01	.5624541+01	.3022224+01	.5369912+01	1	71
.7326920+01	.1714798+01	.4106420+01	.9018814+01	.3143433-00	.2577004+01	1	72

.1075987+02	-.8205019-00	.8585928-00	.1254483+02	-.1388709+01	-.6220374-00	1	73
.1441911+02	-.1554040+01	-.1403452+01	.1645973+02	-.1593306+01	-.1573673+01	1	74
.1859984+02	-.1611921+01	-.1594270+01	.2084181+02	-.1613772+01	-.1595513+01	1	75
.2320502+02	.4248495+01	.1300000+02	.7963085+01	.9595818+01	.8806889-01	1	76
.7071307+01	.8864304+01	.1833653+01	.5928582+01	.7697861+01	.3562204+01	1	77
.4468827+01	.6354014+01	.5273964+01	.2823981+01	.4861396+01	.6942898+01	1	78
.1123439+01	.3294923+01	.8571628+01	-.3564670-00	.1582973+01	.1027001+02	1	79
-.1103349+01	-.7619046-02	.1204287+02	-.1402518+01	-.1139618+01	.1391483+02	1	80
-.1561368+01	-.1539568+01	.1595507+02	-.1609495+01	-.1591550+01	.1809514+02	1	81
-.1612779+01	-.1594669+01	.2033710+02	-.1612989+01	-.1595134+01	.2270031+02	1	82
.4605170+01	.1300000+02	.8200481+01	.9360953+01	-.3098410-00	.7322354+01	1	83
.8445142+01	.1424944+01	.6012414+01	.7095269+01	.3145608+01	.4271631+01	1	84
.5504314+01	.4805265+01	.2399823+01	.3888232+01	.6428827+01	.7346503-00	1	85
.2257362+01	.8041463+01	-.4349913-00	.6343804-00	.9735928+01	-.1124264+01	1	86
-.7500742-00	.1150602+02	-.1515602+01	-.1454348+01	.1337984+02	-.1604049+01	1	87
-.1582191+01	.1542006+02	-.1611386+01	-.1593322+01	.1756013+02	-.1611967+01	1	88
-.1594326+01	.1960209+02	-.1612029+01	-.1594433+01	.2216530+02	.5010635+01	1	89
.1300000+02	.7076272+01	.8611673+01	-.7903264-00	.6106252+01	.7325883+01	1	90
.9156109-00	.4842555+01	.5689744+01	.2580574+01	.3232281+01	.4273936+01	1	91
.4209462+01	.1566485+01	.2663295+01	.5823448+01	.6342535-01	.1100831+01	1	92
.7433857+01	-.1020393+01	-.3915609-00	.9127841+01	-.1494039+01	-.1339367+01	1	93
.1089984+02	-.1600892+01	-.1568212+01	.1277165+02	-.1614519+01	-.1595067+01	1	94
.1481187+02	-.1615576+01	-.1597583+01	.1695193+02	-.1615696+01	-.1597875+01	1	95
.1919389+02	-.1615709+01	-.1597906+01	.2155710+02	.5416100+01	.1300000+02	1	96
.5275411+01	.7545246+01	-.1313792+01	.4318177+01	.6306498+01	.3512294-00	1	97
.2912470+01	.4750387+01	.1982535+01	.1395746+01	.3165806+01	.3603695+01	1	98
-.5783007-01	.1590752+01	.5215775+01	-.1040805+01	.2369191-01	.6825769+01	1	99
-.1481256+01	-.1147263+01	.8519064+01	-.1601565+01	-.1539835+01	.1029164+02	1	100
-.1622537+01	-.1601185+01	.1216345+02	-.1625628+01	-.1609807+01	.1420367+02	1	101
-.1625231+01	-.1609652+01	.1634374+02	-.1625279+01	-.1609765+01	.1858570+02	1	102
-.1625284+01	-.1609799+01	.2094891+02	.5828946+01	.1300000+02	.3917760+01	1	103
.6679357+01	-.1882292+01	.2594405+01	.5234030+01	-.2564633-00	.1135083+01	1	104
.3676239+01	.1366573+01	-.2381127-00	.2092497+01	.2985201+01	-.1110415+01	1	105
.5365695-00	.4596673+01	-.1476051+01	-.7838667-00	.6206535+01	-.1598122+01	1	106
-.1452723+01	.7900402+01	-.1629732+01	-.1599900+01	.9672376+01	-.1635785+01	1	107
-.1622780+01	.1154418+02	-.1636781+01	-.1626285+01	.1358440+02	-.1636916+01	1	108
-.1626748+01	.1572447+02	-.1636932+01	-.1626803+01	.1796643+02	-.1636934+01	1	109
-.1626809+01	.2032964+02	.6214608+01	.1300300+02	.1639776+01	.4645344+01	1	110
-.2448786+01	.2523767-00	.3576776+01	-.8303536-00	-.6209592-00	.2070176+01	1	111
.7893873-00	-.1366494+01	.5558620-00	.2407018+01	-.1566881+01	-.7482923-00	1	112
.4018247+01	-.1632340+01	-.1552190+01	.5628055+01	-.1650631+01	-.1655394+01	1	113
.7321911+01	-.1654794+01	-.1668688+01	.9093882+01	-.1655631+01	-.1670571+01	1	114
.1096569+02	-.1655720+01	-.1670812+01	.1300591+02	-.1655732+01	-.1670844+01	1	115
.1514597+02	-.1655734+01	-.1670848+01	.1738793+02	-.1655734+01	-.1670848+01	1	116
.1975114+02	.6551080+01	.1300000+02	.1037855+01	.4036057+01	-.2947952+01	1	117
-.2688150-00	.2558718+01	-.1332996+01	-.1112817+01	.1042747+01	.2853629-00	1	118
-.1480852+01	-.3930504-00	.1902456+01	-.1605339+01	-.1334825+01	.3513571+01	1	119
-.1642795+01	-.1618139+01	.5123354+01	-.1653149+01	-.1663843+01	.6817204+01	1	120
-.1655360+01	-.1669680+01	.8589174+01	-.1655681+01	-.1670707+01	.1046098+02	1	121
-.1655727+01	-.1670830+01	.1250120+02	-.1655733+01	-.1670846+01	.1464127+02	1	122
-.1655734+01	-.1670848+01	.1688323+02	-.1655734+01	-.1670848+01	.1924644+02	1	123
.6907755+01	.1300000+02	.4137381-00	.3377297+01	-.3479598+01	-.7188094-00	1	124
.1877365+01	-.1866984+01	-.1321200+01	.3798146-00	-.2437243-00	-.1594106+01	1	125
-.9053913-00	.1367537+01	-.1627621+01	-.1517426+01	.2978579+01	-.1648850+01	1	126
-.1648515+01	.4588346+01	-.1654325+01	-.1607547+01	.6282192+01	-.1655570+01	1	127

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-.1670398+01 .8054182+01-.1655708+01-.1670779+01 .9925985+01-.1655731+01   1 128
-.1670839+01 .1196019+02-.1655734+01-.1670847+01 .1410625+02-.1655734+01   1 129
-.1670848+01 .1634821+02-.1655734+01-.1670848+01 .1871142+02 .7313220+01   1 130
 .1300000+02-.2260034-00 .2615656+01-.4085608+01-.1882614+01 .1121463+01   1 131
-.2461720+01-.1470533+01-.3318500-00-.6517030-00-.1602024+01-.1306573+01   1 132
 .7594038-00-.1641669+01-.1612391+01 .2370396+01-.1652604+01-.1662283+01   1 133
 .3980151+01-.1655186+01-.1669332+01 .5673995+01-.1655659+01-.1670648+01   1 134
 .7445964+01-.1655722+01-.1670818+01 .9317769+01-.1655733+01-.1670844+01   1 135
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 .1574002+02-.1655734+01-.1670848+01 .1810323+02 .7718685+01 .1300000+02   1 137
-.7373354-00 .1844760+01-.4692567+01-.1326724+01 .3565200-00-.3969563+01   1 138
-.1555657+01-.9180342-00-.1459772+01-.1628085+01-.1520655+01 .1512447-00   1 139
-.1648948+01-.1648909+01 .1762207+01-.1654226+01-.1667286+01 .3371955+01   1 140
-.1655544+01-.1670325+01 .5065798+01-.1655700+01-.1670759+01 .6837767+01   1 141
-.1655729+01-.1670835+01 .8709571+01-.1655733+01-.1670847+01 .1074979+02   1 142
-.1655734+01-.1670848+01 .1288986+02-.1655734+01-.1670848+01 .1513182+02   1 143
-.1655734+01-.1670848+01 .1749503+02 .0000000    .0000000    .0000000      1 144
         10
DIANE/SCAT  CF2-10A  C1/JT. REDO OF RUN 1-6-67. TEMP(1-2250). TAPE 1432
 .1000000+02 .6550000+03
 1103.       .2100000+02
 .0000000    .1300000+02 .7547093+01 .1166047+02-.2711039+01 .7504677+01   1   1
 .1147181+02-.5046785-00 .7329407+01 .1134207+02 .2129211+01 .6911944+01   1   2
 .1061840+02 .5000933+01 .6286152+01 .9277879+01 .7953599+01 .5447278+01   1   3
 .7833045+01 .1074564+02 .4126678+01 .6245991+01 .1317273+02 .2422501+01   1   4
 .4524271+01 .1527754+02 .7572899-00 .2857616+01 .1756259+02-.9123004-00   1   5
 .1204010+01 .2005305+02-.2598435+01-.7835944-00 .2232766+02-.3462862+01   1   6
-.2620579+01 .2459823+02-.3586981+01-.3427494+01 .2703830+02 .4054651-00   1   7
 .1300000+02 .1050219+02 .1263291+02-.1209925+00 .1039524+02 .1243032+02   1   8
 .2230599+01 .9966466+01 .1220121+02 .4839487+01 .9037897+01 .1107862+02   1   9
 .7379847+01 .7589954+01 .9578130+01 .9645451+01 .5983739+01 .7496177+01   1  10
 .1176509+02 .4244195+01 .6358602+01 .1378998+02 .2440801+01 .4578801+01   1  11
 .1567305+02 .7927939-00 .2729488+01 .1760940+02-.7711164-00 .8925357-00   1  12
 .1970405+02-.2347660+01-.1030345+01 .2202462+02-.3108867+01-.2568168+01   1  13
 .2437796+02-.3091077+01-.2992274+01 .2695623+02 .8109302-00 .1300000+02   1  14
 .1232213+02 .1317655+02 .1406495+01 .1196697+02 .1274353+02 .3705175+01   1  15
 .1112058+02 .1259627+02 .6022170+01 .9629633+01 .1134526+02 .8123408+01   1  16
 .7814211+01 .9646713+01 .9952561+01 .6085647+01 .7932220+01 .1167164+02   1  17
 .4436394+01 .6139171+01 .1350222+02 .2654719+01 .4301271+01 .1542464+02   1  18
 .1016477+01 .2584551+01 .1749012+02-.7465219-00 .7321004-00 .1966886+02   1  19
-.2149399+01-.1109638+01 .2189289+02-.2723852+01-.2408266+01 .2420650+02   1  20
-.2833895+01-.2779773+01 .2661304+02 .1223775+01 .1300000+02 .1291690+02   1  21
 .1335762+02 .2144234+01 .1231562+02 .1304898+02 .4172065+01 .1115468+02   1  22
 .1242677+02 .6097090+01 .9483633+01 .1102205+02 .7913693+01 .7632586+01   1  23
 .9426291+01 .9732046+01 .6027615+01 .7760642+01 .1154806+02 .4455503+01   1  24
 .6012017+01 .1338605+02 .2781280+01 .4215401+01 .1525876+02 .1035288+01   1  25
 .2360239+01 .1721463+02-.6006330-00 .5641446-00 .1939441+02-.1842721+01   1  26
-.1122354+01 .2166547+02-.2302978+01-.2208255+01 .2395715+02-.2460043+01   1  27
-.2428957+01 .2637137+02 .1609438+01 .1300000+02 .1290064+02 .1326608+02   1  28
 .2193189+01 .1225688+02 .1296462+02 .4046000+01 .1103537+02 .1228752+02   1  29
 .5934284+01 .9419351+01 .1095172+02 .7781876+01 .7884035+01 .9330686+01   1  30
 .9558388+01 .6275537+01 .7649596+01 .1129968+02 .4679412+01 .5854646+01   1  31
 .1313830+02 .2893466+01 .4009520+01 .1503058+02 .1008895+01 .2154151+01   1  32
 .1697772+02-.7484303-00 .3158765-00 .1911014+02-.1868075+01-.1333371+01   1  33
 .2131135+02-.2227604+01-.2122992+01 .2359088+02-.2219911+01-.2198324+01   1  34
```

.2603675+02	.1945910+01	.1300000+02	.1268217+02	.1310988+02	.2111182+01	1	35
.1222513+02	.1305626+02	.3923891+01	.1111941+02	.1229815+02	.5755051+01	1	36
.9593127+01	.1021031+02	.7559805+01	.7917677+01	.9032160+01	.9346267+01	1	37
.6133008+01	.7183298+01	.1108371+02	.4290368+01	.5405548+01	.1288384+02	1	38
.2521637+01	.3643440+01	.1473961+02	.7933840-00	.1819631+01	.1667003+02	1	39
-.6476808-00	.2424725-01	.1678966+02	-.1798565+01	-.1435198+01	.2098289+02	1	40
-.2038617+01	-.1971696+01	.2324495+02	-.2046148+01	-.2028262+01	.2571173+02	1	41
.2302585+01	.1300000+02	.1207132+02	.1291625+02	.1932369+01	.1174674+02	1	42
.1275836+02	.3726653+01	.1085233+02	.1169052+02	.5514187+01	.9250095+01	1	43
.1001772+02	.7305630+01	.7386324+01	.6280637+01	.9064077+01	.5666555+01	1	44
.6572273+01	.1077247+02	.4040449+01	.4904632+01	.1255145+02	.2283293+01	1	45
.3218711+01	.1439523+02	.4576852-00	.1479561+01	.1634014+02	-.1058264+01	1	46
-.3001990-00	.1844397+02	-.1726168+01	-.1491579+01	.2064953+02	-.1906957+01	1	47
-.1873771+01	.2292215+02	-.1938641+01	-.1923261+01	.2528998+02	.2708050+01	1	48
.1300000+02	.1120083+02	.1239450+02	.1655040+01	.1099385+02	.1185127+02	1	49
.3420870+01	.1019470+02	.1070806+02	.5199428+01	.8639491+01	.9180380+01	1	50
.6949265+01	.6944064+01	.7666684+01	.8678281+01	.5291292+01	.6097164+01	1	51
.1037990+02	.3544073+01	.4413232+01	.1214497+02	.1737241+01	.2688730+01	1	52
.1398579+02	-.5510045-01	.8726654-00	.1588879+02	-.1377007+01	-.8520809-00	1	53
.1793598+02	-.1844236+01	-.1732904+01	.2007740+02	-.1920666+01	-.1902284+01	1	54
.2232276+02	-.1915054+01	-.1902533+01	.2470601+02	.3113515+01	.1300000+02	1	55
.1018901+02	.1151825+02	.1308286+01	.1004031+02	.1083787+02	.3060165+01	1	56
.9407133+01	.9873286+01	.4808063+01	.8005715+01	.8457803+01	.6544097+01	1	57
.6365100+01	.6890816+01	.8251274+01	.4446723+01	.5169160+01	.9921783+01	1	58
.2478079+01	.3370968+01	.1163937+02	.5979061-00	.1588047+01	.1342115+02	1	59
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.1061510+02	.9011609-00	.9037718+01	.9990143+01	.2622758+01	.8337021+01	1	63
.8941933+01	.4360086+01	.7026176+01	.7345654+01	.6053299+01	.5225624+01	1	64
.5708013+01	.7715132+01	.338[illegible]409+01	.4107867+01	.9359222+01	.1661548+01	1	65
.2493217+01	.1107681+02	.1076416+00	.8789439-00	.1286910+02	-.1083863+01	1	66
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.4626488-00	.8272968+01	.9181931+01	.2169827+01	.7298558+01	.7990686+01	1	69
.3877198+01	.5045310+01	.2466325+01	.5550705+01	.4168806+01	.4904684+01	1	70
.7199860+01	.2533[illegible]07+01	.3401136+01	.8430521+01	.8340384-00	.1747673+01	1	71
.1054775+02	-.6534982-00	.1021398+00	.1232555+02	-.1457158+01	-.1124961+01	1	72
.1420803+02	-.1698337+01	-.1605499+01	.1628721+02	-.1722890+01	-.1697550+01	1	73
.1847190+02	-.1693911+01	-.1677565+01	.2075899+02	-.1661205+01	-.1647003+01	1	74
.2315724+02	.4246495+01	.1300000+02	-.1435773+02	.9303107+01	.6326289-01	1	75
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.4953545+01	.5683273+01	.5095320+01	.3244823+01	.4163405+01	.6734417+01	1	77
.1584277+01	.2719970+01	.8364806+01	.2376625-00	.1447175+01	.1009368+02	1	78
-.8088574-00	.2272949-00	.1191111+02	-.1399604+01	-.8357070-00	.1382809+02	1	79
-.1604005+01	-.1446905+01	.1590387+02	-.1648169+01	-.1614080+01	.1805279+02	1	80
-.1653900+01	-.1637373+01	.2029594+02	-.1654676+01	-.1639923+01	.2265928+02	1	81
.4605170+01	.1300000+02	.8119386+01	.8862914+01	-.3970450-00	.7247980+01	1	82
.7824622+01	.1286051+01	.5884590+01	.6498597+01	.2951666+01	.4316667+01	1	83
.5221321+01	.4615778+01	.2811858+01	.4016592+01	.6277778+01	.1435186+01	1	84
.2784499+01	.7937137+01	.5530385-01	.1375180+01	.9672264+01	-.1028285+01	1	85
-.1083551+00	.1146220+02	-.1512191+01	-.1190198+01	.1333804+02	-.1624243+01	1	86
-.1569919+01	.1537894+02	-.1645872+01	-.1632871+01	.1751910+02	-.1653722+01	1	87
-.1639939+01	.1976107+02	-.1654305+01	-.1640335+01	.2212428+02	.5018635+01	1	88
.1300008+02	.7768547+01	.8485655+01	-.9311653-00	.6768803+01	.7510131+01	1	89

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 .7368869+01-.6968979-00 .4066673-00 .9086055+01-.1312591+01-.8798327-00   1  92
 .1085808+02-.1543321+01-.1493124+01 .1273060+02-.1636498+01-.1624145+01   1  93
 .1477084+02-.1647931+01-.1635237+01 .1691091+02-.1648622+01-.1636056+01   1  94
 .1915287+02-.1648667+01-.1636127+01 .2151608+02 .5416100+01 .1300000+02   1  95
 .7120055+01 .8037009+01-.1450449+01 .6313749+01 .7017744+01 .2419597-00   1  96
 .4933084+01 .5607610+01 .1912892+01 .3163228+01 .4009760+01 .3552805+01   1  97
 .1404750+01 .2440166+01 .5172494+01-.1627668-01 .6591304-00 .6784272+01   1  98
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-.1619917+01-.1600575+01 .1212342+02-.1634515+01-.1622565+01 .1416265+02   1 100
-.1635085+01-.1624697+01 .1630271+02-.1636002+01-.1625136+01 .1854467+02   1 101
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 .7259279+01-.1990605+01 .4751830+01 .5962737+01-.3243730-00 .3390366+01   1 103
 .4416763+01 .1317130+01 .1806731+01 .2793429+01 .2939995+01 .2691323-00   1 104
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 .3138595+01-.1905587+01-.6179976-00 .1581661+01-.2872753-00-.1367381+01   1 124
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-.1637020+01 .1192516+02-.1643994+01-.1637090+01 .1406523+02-.1643996+01   1 128
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-.1655687+01-.1669653+01 .5024753+01-.1655906+01-.1670285+01 .6796740+01   1 140
-.1655946+01-.1670395+01 .8668547+01-.1655953+01-.1670413+01 .1070877+02   1 141
-.1655954+01-.1670415+01 .1284883+02-.1655954+01-.1670415+01 .1509080+02   1 142
-.1655954+01-.1670415+01 .1745400+02 .0000000    .0000000    .0000000      1 143
         29
```

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DIANL/SCAT  CH2-16A  TEMP(1.5-1.E4)  4-19-67  INPUT TAPES(1832,1980)
 .1600000+02 .9840000+03
  1101.       .2400000+02
 .4054651-00 .1300000+02 .9764729+01 .1295500+02 .1383869+01 .9633694+01   1   1
 .1268730+02 .3747165+01 .9461782+01 .1253182+02 .6374426+01 .9025431+01   1   2
 .1193056+02 .8982454+01 .8074976+01 .1056852+02 .1132741+02 .6702258+01   1   3
 .3883696+01 .1332805+02 .5036621+01 .7031163+01 .1515488+02 .3339464+01   1   4
 .5187067+01 .1696407+02 .1875346+01 .3409634+01 .1888487+02 .4295530-00   1   5
 .1729208+01 .2105526+02-.1101558+01-.1032583+00 .2328186+02-.1937739+01   1   6
-.1606052+01 .2554003+02-.2130750+01-.2087766+01 .2790562+02 .8109302-00   1   7
 .1300000+02 .1175480+02 .1352039+02 .2848452+01 .1145070+02 .1317842+02   1   8
 .5153553+01 .1062956+02 .1266605+02 .7435519+01 .9793998+01 .1132775+02   1   9
 .9469496+01 .8403467+01 .9629896+01 .1124630+02 .7031560+01 .8068446+01   1  10
 .1294499+02 .5547364+01 .6584786+01 .1475643+02 .3748257+01 .4889369+01   1  11
 .1661204+02 .1823063+01 .2990150+01 .1850991+02-.5597503-01 .1039643+01   1  12
 .2057283+02-.1304719+01-.5739027-00 .2279808+02-.1770353+01-.1595438+01   1  13
 .2513383+02-.1922749+01-.1890176+01 .2752053+02 .1223775+01 .1300000+02   1  14
 .1250998+02 .1330856+02 .3379311+01 .1204608+02 .1263440+02 .5404924+01   1  15
 .1127470+02 .1188333+02 .7321353+01 .1010157+02 .1085163+02 .9133578+01   1  16
 .8525089+01 .9363499+01 .1087310+02 .6750596+01 .7698874+01 .1255041+02   1  17
 .5191487+01 .6126981+01 .1430529+02 .3524366+01 .4586608+01 .1617237+02   1  18
 .1700609+01 .2818544+01 .1810590+02-.5646175-01 .9325317-00 .2019011+02   1  19
-.1219556+01-.6277126-00 .2241938+02-.1648142+01-.1526216+01 .2471129+02   1  20
-.1753719+01-.1726286+01 .2708238+02 .1609438+01 .1300000+02 .1212276+02   1  21
 .1277869+02 .3340534+01 .1186912+02 .1214373+02 .5178144+01 .1115179+02   1  22
 .1148338+02 .6782843+01 .9950003+01 .1055727+02 .8747786+01 .8384635+01   1  23
 .9195820+01 .1046854+02 .6692988+01 .7610708+01 .1216743+02 .5026033+01   1  24
 .5902808+01 .1392742+02 .3334480+01 .4252479+01 .1578040+02 .1417726+01   1  25
 .2464057+01 .1770436+02-.4282409-00 .4911579-00 .1975741+02-.1442680+01   1  26
-.1076217+01 .2169933+02-.1711489+01-.1651051+01 .2414151+02-.1756469+01   1  27
-.1739528+01 .2650475+02 .1945910+01 .1300000+02 .1144062+02 .1239220+02   1  28
 .3110748+01 .1132677+02 .1186937+02 .4885088+01 .1079169+02 .1134037+02   1  29
 .6667796+01 .9621458+01 .1030731+02 .8405127+01 .6078767+01 .8420845+01   1  30
 .1011697+02 .6446186+01 .7127596+01 .1181067+02 .4441223+01 .5372466+01   1  31
 .1355356+02 .2353429+01 .3504296+01 .1533954+02 .4292062-00 .1534757+01   1  32
 .1721407+02-.9944797-00-.3379901-00 .1925474+02-.1575732+01-.1446091+01   1  33
 .2139486+02-.1723595+01-.1713000+01 .2363683+02-.1762629+01-.1746330+01   1  34
 .2600004+02 .2302585+01 .1300000+02 .1054359+02 .1195351+02 .2786907+01   1  35
 .1045140+02 .1155089+02 .4561815+01 .1004790+02 .1089464+02 .6282113+01   1  36
 .9050450+01 .9613092+01 .8010782+01 .7364329+01 .7844023+01 .9696730+01   1  37
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 .1446994+01 .2362795+01 .1480747+02-.1901210-00 .5274138-00 .1667952+02   1  39
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-.1752568+01-.1736584+01 .2310182+02-.1766611+01-.1748535+01 .2546503+02   1  41
 .2708050+01 .1300000+02 .9255597+01 .1130329+02 .2356948+01 .8915246+01   1  42
 .1075099+02 .4094465+01 .8259007+01 .9801221+01 .5799127+01 .7135246+01   1  43
 .8223694+01 .7474531+01 .5632059+01 .6475497+01 .9114611+01 .3975554+01   1  44
 .4737740+01 .1073172+02 .2228376+01 .2956506+01 .1242721+02 .5190620-00   1  45
 .1171853+01 .1419950+02-.8203968-00-.4669142-00 .1607138+02-.1534158+01   1  46
-.1458016+01 .1811174+02-.1732836+01-.1708101+01 .2025292+02-.1753107+01   1  47
-.1733335+01 .2250470+02-.1698027+01-.1679098+01 .2492639+02 .3117515+01   1  48
 .1300000+02 .8092773+01 .1055209+02 .1857533+01 .7391054+01 .9733278+01   1  49
 .3571213+01 .6289063+01 .8496073+01 .5234485+01 .5014672+01 .6957268+01   1  50
 .6882767+01 .3553523+01 .5282464+01 .8510843+01 .2054796+01 .3610425+01   1  51
 .1012507+02 .6311584-00 .1958582+01 .1182229+02-.4206936-00 .5793864-00   1  52
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.1763758+02	-.1572754+01	-.1483350+01	.1941306+02	-.1530482+01	-.1497499+01	1	54
.2211950+02	-.1467972+01	-.1467791+01	.2452643+02	.3526360+01	.1300000+02	1	55
.7389715+01	.9728754+01	.1305520+01	.6361231+01	.8657004+01	.2096197+01	1	56
.5170274+01	.7380153+01	.4643115+01	.3842193+01	.6039451+01	.6277859+01	1	57
.2699584+01	.4933459+01	.7927661+01	.1661219+01	.3900529+01	.9597483+01	1	58
.5323120-00	.2627698+01	.1134843+02	-.3944063-00	.1280537+01	.1317328+02	1	59
-.1100967+01	-.1766539-01	.1510392+02	-.1405448+01	-.1071707+01	.1716744+02	1	60
-.1470470+01	-.1406546+01	.1931135+02	-.1478407+01	-.1456114+01	.2155378+02	1	61
-.1479767+01	-.1461615+01	.2391704+02	.3912023+01	.1300000+02	.7477270+01	1	62
.9469303+01	.7651116-00	.6419098+01	.8649841+01	.2452872+01	.5336736+01	1	63
.7633627+01	.4131323+01	.4157394+01	.6487991+01	.5817433+01	.2885388+01	1	64
.5227115+01	.7495916+01	.1588953+01	.3961578+01	.9166174+01	.2372210-00	1	65
.2432940+01	.1089525+02	-.6000656-00	.7367323-00	.1267696+02	-.1295435+01	1	66
-.6556025-00	.1455063+02	-.1430390+01	-.1316536+01	.1659115+02	-.1465784+01	1	67
-.1448299+01	.1873125+02	-.1483645+01	-.1464002+01	.2047322+02	-.1485908+01	1	68
-.1465200+01	.2333643+02	.4246495+01	.1300000+02	.7951146+01	.9484979+01	1	69
.3481782-00	.7012530+01	.8740396+01	.2043270+01	.5803022+01	.7552055+01	1	70
.3739485+01	.4341516+01	.6215017+01	.5425771+01	.2692728+01	.4718108+01	1	71
.7079948+01	.1014950+01	.3151185+01	.8704333+01	-.3739040-00	.1448887+01	1	72
.1040166+02	-.1032864+01	-.9312502-01	.1217432+02	-.1297430+01	-.1106225+01	1	73
.1404624+02	-.1451240+01	-.1426908+01	.1698648+02	-.1496772+01	-.1468119+01	1	74
.1822655+02	-.1501139+01	-.1471564+01	.2046851+02	-.1501541+01	-.1471891+01	1	75
.2283172+02	.4605170+01	.1300000+02	.8138971+01	.9253055+01	-.9434952-01	1	76
.7215739+01	.6309998+01	.1597730+01	.5897922+01	.6961926+01	.3293080+01	1	77
.4142991+01	.5364601+01	.4940126+01	.2277393+01	.3747135+01	.6560663+01	1	78
.6586024-00	.2119681+01	.8172965+01	-.4277669-00	.5238619-00	.9867352+01	1	79
-.1081810+01	-.7803937-00	.1163943+02	-.1445936+01	-.1375551+01	.1351125+02	1	80
-.1525799+01	-.1480245+01	.1555147+02	-.1534183+01	-.1491097+01	.1769154+02	1	81
-.1534978+01	-.1492177+01	.1993350+02	-.1535064+01	-.1492292+01	.2229671+02	1	82
.5010635+01	.1300000+02	.6935329+01	.8491041+01	-.6124792-00	.5970627+01	1	83
.7206994+01	.1062101+01	.4706351+01	.5757540+01	.2717146+01	.3099672+01	1	84
.4139365+01	.4341273+01	.1445713+01	.2526570+01	.5954591+01	-.2448693-01	1	85
.9753449-00	.7565213+01	-.1047230+01	-.4674050-00	.9259238+01	-.1469864+01	1	86
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-.1527479+01	.1494327+02	-.1577212+01	-.1530300+01	.1708334+02	-.1577379+01	1	88
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.4867079-00	.2760289+01	.4623784+01	.2116618+01	.1251613+01	.3036111+01	1	91
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     2101. .9000000E+01
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0.953102-01	0.120000+02	0.752983+01	0.103258+02	-0.574213+00	0.747233+01	13	96
0.103093+02	0.645128+00	0.746909+01	0.102991+02	0.167849+01	0.745908+01	13	97
0.102271+02	0.345944+01	0.742093+01	0.101596+02	0.554757+01	0.732211+01	13	98
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0.314734+01	0.886068+01	0.111005+02	0.493313+01	0.870093+01	0.109374+02	13	104
0.694449+01	0.835[illegible]+01	0.106[illegible]+02	0.870777+01	0.764150+01	0.[illegible]+01	13	105
0.104[illegible]+02	0.[illegible]+01	0.[illegible]+01	0.117[illegible]+02	0.[illegible]+01	0.[illegible]+01	13	106
0.130833+02	0.313[illegible]+01	0.[illegible]+01	0.154[illegible]+02	0.113776+01	0.273157+01	13	107
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0.541052+01	0.722921+01	0.129843+02	0.319642+01	0.484242+01	0.153273+02	13	113
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0.110627+02	0.360417+01	0.107764+02	0.117258+02	0.459525+01	0.104007+02	13	116
0.113686+02	0.610000+01	0.973234+01	0.107621+02	0.759420+01	0.894476+01	13	117
0.100051+02	0.883037+01	0.803390+01	0.902013+01	0.101201+02	0.722713+01	13	118
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0.125005+02	0.410368+01	0.523286+01	0.149984+02	0.193531+01	0.312335+01	13	126
0.174637+02	-0.110363+00	0.989948+00	0.198482+02	0.160944+01	0.120000+02	13	127
0.116065+02	0.119011+02	0.243577+01	0.114515+02	0.117872+02	0.359210+01	13	128
0.112599+02	0.117019+02	0.444727+01	0.107377+02	0.115150+02	0.577175+01	13	129
0.101232+02	0.111393+02	0.717862+01	0.947308+01	0.104691+02	0.842253+01	13	130
0.846387+01	0.946533+01	0.977002+01	0.741178+01	0.842660+01	0.109866+02	13	131
0.617425+01	0.720249+01	0.122843+02	0.399376+01	0.498233+01	0.147431+02	13	132
0.164897+01	0.281761+01	0.171695+02	-0.508471+00	0.561163+00	0.194975+02	13	133
0.194591+01	0.120000+02	0.112437+02	0.117122+02	0.230915+01	0.111748+02	13	134
0.115938+02	0.342479+01	0.110943+02	0.115196+02	0.426020+01	0.108623+02	13	135
0.114481+02	0.556478+01	0.102725+02	0.109867+02	0.696129+01	0.943752+01	13	136
0.102131+02	0.820221+01	0.831713+01	0.912260+01	0.952901+01	0.727135+01	13	137
0.800579+01	0.107256+02	0.596144+01	0.672418+01	0.120151+02	0.320889+01	13	138
0.435367+01	0.143811+02	0.695849+00	0.189088+01	0.166924+02	-0.109768+01	13	139
-0.318405+00	0.189958+02	0.230259+01	0.120000+02	0.104956+02	0.113661+02	13	140
0.210518+01	0.104768+02	0.112748+02	0.319621+01	0.104260+02	0.112125+02	13	141
0.401383+01	0.102090+02	0.110192+02	0.529139+01	0.970243+01	0.103961+02	13	142
0.666142+01	0.891237+01	0.945323+01	0.788132+01	0.769139+01	0.816482+01	13	143
0.917702+01	0.637180+01	0.693233+01	0.103195+02	0.487068+01	0.560538+01	13	144
0.115433+02	0.223845+01	0.315921+01	0.138547+02	-0.152030-02	0.833605+00	13	145
0.161582+02	-0.135894+01	-0.107036+01	0.184609+02	0.	0.	13	146

21

DIANE/SCAT FE-10A THETA(50-10000) 10 FREQ CI/FCT 5-24-67 TRT 2

```
 .1000000+02 .7200000+03
    1026.    .1800000+02
 .3912023+01 .1300000+02 .8499758+01 .9440543+01 .1942718-00 .7900278+01   1   1
 .8709759+01 .1808481+01 .7085757+01 .7868226+01 .3434911+01 .6144719+01   1   2
 .6733546+01 .5093654+01 .4944372+01 .5577903+01 .6782214+01 .3441385+01   1   3
 .4179883+01 .8460382+01 .1801340+01 .2514238+01 .1019924+02 .3197453-01   1   4
 .7426812-00 .1198690+02-.1331245+01-.8849288-00 .1386206+02-.1958036+01   1   5
-.1872954+01 .1590318+02-.2122369+01-.2112409+01 .1804610+02-.2142426+01   1   6
-.2126309+01 .2030664+02-.2102409+01-.2084402+01 .2271566+02 .4248495+01   1   7
 .1300000+02 .7715992+01 .9014767+01-.2915556-00 .7500085+01 .8383217+01   1   8
 .1345865+01 .7031233+01 .7538081+01 .3024585+01 .5972601+01 .6373359+01   1   9
 .4706525+01 .4433618+01 .4882318+01 .6371163+01 .2800143+01 .3267841+01   1  10
 .6009557+01 .1034197+01 .1551222+01 .9713800+01-.4976113-00-.6509645-01   1  11
 .1149573+02-.1511695+01-.1308070+01 .1339719+02-.1923450+01-.1869955+01   1  12
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 .2001307+02-.1868988+01-.1850584+01 .2244484+02 .4605170+01 .1200000+02   1  14
 .6733208+01 .7901794+01 .9058904-00 .6090207+01 .6886960+01 .2577573+01   1  15
 .4907217+01 .5410228+01 .4232151+01 .3579740+01 .4014594+01 .5877425+01   1  16
 .2193954+01 .2684060+01 .7530143+01 .7123059-00 .1314974+01 .9279661+01   1  17
-.6691641-00-.6381424-01 .1112179+02-.1485230+01-.1180427+01 .1307181+02   1  18
-.1751558+01-.1675519+01 .1518218+02-.1788969+01-.1763271+01 .1736931+02   1  19
-.1773529+01-.1754235+01 .1964064+02-.1766396+01-.1747955+01 .2201271+02   1  20
 .5010635+01 .1100000+02 .5349314+01 .6433593+01 .2058430+01 .4353705+01   1  21
 .5263124+01 .3741807+01 .3135528+01 .4139209+01 .5436425+01 .1781856+01   1  22
 .2688394+01 .7130466+01 .3379003-00 .1276476+01 .8894555+01-.8763004-00   1  23
-.1731349-00 .1071285+02-.1537331+01-.1256275+01 .1261067+02-.1725216+01   1  24
-.1668774+01 .1465898+02-.1757824+01-.1737675+01 .1680031+02-.1763679+01   1  25
-.1746082+01 .1904242+02-.1765209+01-.1746998+01 .2140565+02 .5416100+01   1  26
 .1300000+02 .6998105+01 .7883419+01-.1779000+01 .6286005+01 .7256236+01   1  27
-.8853862-01 .5035137+01 .6043828+01 .1616292+01 .3901158+01 .4906416+01   1  28
 .3321289+01 .2612975+01 .3604571+01 .5003401+01 .1077145+01 .2036894+01   1  29
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 .6476694+01 .7447637+01-.2251478+01 .5780140+01 .6682255+01-.5547669-00   1  34
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 .1741204+01 .2473921+01 .4435802+01 .1578470-00 .8860721-00 .6052956+01   1  36
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-.1763651+01-.1745438+01 .1557374+02-.1759338+01-.1740990+01 .1782096+02   1  39
-.1737157+01-.1718605+01 .2020645+02 .6214608+01 .1300000+02 .5238476+01   1  40
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 .6706329+01-.1648296+01-.1443611+01 .8502528+01-.1676190+01-.1622217+01   1  51
 .1038641+02-.1682098+01-.1660699+01 .1242936+02-.1684394+01-.1666510+01   1  52
 .1456981+02-.1685240+01-.1666995+01 .1681181+02-.1685256+01-.1667008+01   1  53
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-.1633825+01-.1567657+01 .7982347+01-.1669235+01-.1653883+01 .9854495+01   1  58
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-.1639696+01-.1634258+01 .8480122+01-.1639836+01-.1634551+01 .1052034+02   1  79
-.1639854+01-.1634590+01 .1266041+02-.1639856+01-.1634595+01 .1490237+02   1  80
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-.1635937+01 .8337157+01-.1637158+01-.1636107+01 .1037738+02-.1637165+01   1  86
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 .1259290+01-.1608068+01-.1577064+01 .2869026+01-.1631576+01-.1625380+01   1  91
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 .1238693+02-.1634997+01-.1633326+01 .1462089+02-.1634998+01-.1633326+01   1  94
 .1699210+02 .8131531+01 .1300000+02 .2119519+01 .3747992+01-.5406350+01   1  95
 .9914579-00 .2343812+01-.3774363+01-.2815460-00 .8397392-00-.2153749+01   1  96
-.1168283+01-.5376478-00-.5396677-00-.1528238+01-.1373534+01 .1071595+01   1  97
-.1615758+01-.1590237+01 .2601291+01-.1630370+01-.1624227+01 .4375124+01   1  98
-.1632022+01-[illegible]-[illegible] .[illegible]-.[illegible]-.[illegible] .[illegible]   1  99
-.1632633+01-.1629967+01 .1005912+02-.1632640+01-.1629985+01 .1219918+02   1 100
-.1632641+01-.1629987+01 .1444114+02-.1632641+01-.1629987+01 .1680435+02   1 101
 .8517193+01 .1000000+02 .5561499-00 .2812914+01-.5971634+01-.5687791-00   1 102
 .1288927+01-.4346797+01-.1200105+01-.7521593-01-.2730772+01-.1508121+01   1 103
-.1156931+01-.1117215+01-.1607371+01-.1545187+01 .4931751-00-.1629857+01   1 104
-.1617739+01 .2102813+01-.1634409+01-.1630814+01 .3796634+01-.1635819+01   1 105
-.1634537+01 .5568598+01-.1635976+01-.1634943+01 .7440402+01-.1636000+01   1 106
-.1635006+01 .9480623+01 .8853665+01 .1300000+02-.4678222-00 .1993384+01   1 107
-.6470745+01-.1194876+01 .4584320-00-.4849929+01-.1485676+01-.7658047-00   1 108
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 .3291926+01-.1641773+01-.1641430+01 .5063890+01-.1641838+01-.1641626+01   1 111
 .6935693+01-.1641848+01-.1641658+01 .6975914+01-.1641849+01-.1641662+01   1 112
 .1111598+02-.1641649+01-.1641662+01 .1335794+02-.1641849+01-.1641662+01   1 113
 .1572115+02 .9210340+01 .1300000+02-.1359786+01 .6074121-00-.7002565+01   1 114
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-.1645726+01-.1612455+01-.2156741+01-.1650989+01-.1651293+01-.5465033-00   1 116
-.1655258+01-.1663228+01 .1063101+01-.1655470+01-.1664707+01 .2756914+01   1 117
-.1655512+01-.1664985+01 .4526878+01-.1655520+01-.1665033+01 .6400681+01   1 118
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-.1655521+01-.1665042+01 .1282293+02-.1655521+01-.1665042+01 .1518614+02   1 120
          0
 GREY DIANE LIVERMORE IRON DATA. GINA IRONIC      APRIL 5, 1966
 .1000000+01 .4140000+03
      3026. .1800000E+02
 .3912020+01 .7000000+01 .7992940+01 .7992940+01-.2302590+01 .8514590+01   1   1
 .8514590+01-.6931470-00 .8622990+01 .8622990+01-.0000000    .8429670+01   1   2
 .8429670+01 .1609440+01 .8247480+01 .8247480+01 .2302590+01 .7298450+01   1   3
 .7298450+01 .3912020+01 .6661650+01 .6661650+01 .4605170+01 .4317490+01   1   4
 .7000000+01 .8029760+01 .8029760+01-.2302590+01 .8279700+01 .8279700+01   1   5
-.6931470-00 .8113730+01 .8113730+01-.0000000    .7754480+01 .7754480+01   1   6
 .1609440+01 .7481560+01 .7481560+01 .2302590+01 .6491940+01 .6491940+01   1   7
 .3912020+01 .5852200+01 .5852200+01 .4605170+01 .4605170+01 .7000000+01   1   8
 .8038510+01 .8038510+01-.2302590+01 .7956480+01 .7956480+01-.6931470-00   1   9
 .7736310+01 .7736310+01-.0000000    .7247790+01 .7247790+01 .1609440+01   1  10
 .6963190+01 .6963190+01 .2302590+01 .5923450+01 .5923450+01 .3912020+01   1  11
 .5283200+01 .5283200+01 .4605170+01 .5010640+01 .7000000+01 .7868250+01   1  12
 .7868250+01-.2302590+01 .7557470+01 .7557470+01-.6931470-00 .7347300+01   1  13
 .7347300+01-.0000000    .6547500+01 .6547500+01 .1609440+01 .6176080 01   1  14
 .6176080+01 .2302590+01 .5010640+01 .5010640+01 .3912020+01 .4347690+01   1  15
 .4347690+01 .4605170+01 .5298320+01 .7000000+01 .7658700+01 .7658700+01   1  16
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-.0000000    .6215610+01 .6215610+01 .1609440+01 .5648620+01 .5648620+01   1  18
 .2302590+01 .4484920+01 .4484920+01 .3912020+01 .3663560+01 .3663560+01   1  19
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 .6637260+01 .6637260+01-.6931470-00 .6439350+01 .6439350+01-.0000000      1  21
 .5349010+01 .5349010+01 .1609440+01 .4677490+01 .4677490+01 .2302590+01   1  22
 .2927450+01 .2927450+01 .3912020+01 .2093100+01 .2093100+01 .4605170+01   1  23
 .5991460+01 .7000000+01 .5997200+01 .5997200+01-.2302590+01 .5555670+01   1  24
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 .3895890+01 .1609440+01 .3242590+01 .3242590+01 .2302590+01 .1660130+01   1  26
 .1660130+01 .3912020+01 .9895410-00 .9895410-00 .4605170+01 .6214610+01   1  27
 .7000000+01 .5181220+01 .5181220+01-.2302590+01 .4587720+01 .4587720+01   1  28
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 .1609440+01 .2236450+01 .2236450+01 .2302590+01 .7929930-00 .7929930-00   1  30
 .3912020+01 .1906200-00 .1906200-00 .4605170+01 .6551080+01 .7000000+01   1  31
 .3867030+01 .3867030+01-.2302590+01 .2898120+01 .2898120+01-.6931470-00   1  32
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 .4574250-00 .4574250-00 .2302590+01-.6143360-00-.6143360-00 .3912020+01   1  34
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 .3441380+01-.2302590+01 .2348510+01 .2348510+01-.6931470-00 .1766440+01   1  36
 .1766440+01-.0000000    .4946960-00 .4946960-00 .1609440+01 .1093990-01   1  37
 .1093990-01 .2302590+01-.8964880-00-.8964880-00 .3912020+01-.1127010+01   1  38
-.1127010+01 .4605170+01 .6907760+01 .7000000+01 .2857620+01 .2857620+01   1  39
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 .4605170+01 .7313220+01 .7000000+01 .2330200+01 .2330200+01-.2302590+01    1  43
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-.1398370+01-.1398370+01 .3912020+01-.1518680+01-.1518680+01 .4605170+01    1  46
 .7600900+01 .7000000+01 .2018900+01 .2018900+01-.2302590+01 .5341510-00    1  47
 .5341510-00-.6931470-00 .1980260-01 .1980260-01-.0000000    -.8770700-00   1  48
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-.1514130+01 .3912020+01-.1609440+01-.1609440+01 .4605170+01 .7824050+01    1  50
 .7000000+01 .1172480+01 .1172480+01-.2302590+01-.1444480-00-.1444480-00    1  51
-.6931470-00-.5516480-00-.5516480-00-.0000000    -.1180910+01-.1180910+01   1  52
 .1609440+01-.1328030+01-.1328030+01 .2302590+01-.1629640+01-.1629640+01    1  53
 .3912020+01-.1672910+01-.1672910+01 .4605170+01 .8160520+01 .7000000+01    1  54
-.1404120-00-.1404120-00-.2302590+01-.9675840-00-.9675840-00-.6931470-00    1  55
-.1224160+01-.1224160+01-.0000000    -.1604450+01-.1604450+01 .1609440+01   1  56
-.1660730+01-.1660730+01 .2302590+01-.1714800+01-.1714800+01 .3912020+01    1  57
-.1723170+01-.1723170+01 .4605170+01 .8517190+01 .7000000+01-.1207310+01    1  58
-.1207310+01-.2302590+01-.1589640+01-.1589640+01-.6931470-00-.1650260+01    1  59
-.1650260+01-.0000000    -.1742970+01-.1742970+01 .1609440+01-.1754460+01   1  60
-.1754460+01 .2302590+01-.1754460+01-.1754460+01 .3912020+01-.1757360+01    1  61
-.1757360+01 .4605170+01 .8922660+01 .7000000+01-.1645070+01-.1645070+01    1  62
-.2302590+01-.1731610+01-.1731610+01-.6931470-00-.1760260+01-.1760260+01    1  63
-.0000000    -.1771960+01-.1771960+01 .1609440+01-.1771960+01-.1771960+01   1  64
 .2302590+01-.1773130+01-.1773130+01 .3912020+01-.1773130+01-.1773130+01    1  65
 .4605170+01 .9210340+01 .7000000+01-.1783790+01-.1783790+01-.2302590+01    1  66
-.1826350+01-.1826350+01-.6931470-00-.1838850+01-.1838850+01-.0000000       1  67
-.1845160+01-.1845160+01 .1609440+01-.1845160+01-.1845160+01 .2302590+01    1  68
-.1842630+01-.1842630+01 .3912020+01-.1842630+01-.1842630+01 .4605170+01    1  69
         16
DIANE/SCAT  UGRANITE-1A  TEMP(1-2250)  1 FREQ  C1/KOP  2-16-67
 .1000000+01 .6010000+03
        1126. .2100000+02
 .0000000     .1300000+02 .6513020+01 .9403546+01 .3787374-01 .6918841+01    1   1
 .9303596+01 .2212227+01 .6833137+01 .9292392+01 .4766373+01 .6577467+01    1   2
 .8997217+01 .7374318+01 .5889078+01 .8224692+01 .9684505+01 .4776727+01    1   3
 .6890391+01 .1162380+02 .3380773+01 .5513859+01 .1359640+02 .2076541+01    1   4
 .4253548+01 .1579495+02 .6876317-00 .2759852+01 .1796800+02-.7810312-00    1   5
 .1142955+01 .2020067+02-.2328005+01-.7396810-00 .2245339+02-.3226117+01    1   6
-.2571975+01 .2471543+02-.3520975+01-.3433227+01 .2708111+02 .4054651-00    1   7
 .1300000+02 .9248431+01 .1063106+02 .1493642+01 .9091214+01 .1039440+02    1   8
 .3634363+01 .8816710+01 .1003615+02 .5879242+01 .8297439+01 .9482962+01    1   9
 .7977748+01 .7410354+01 .8639601+01 .1003126+02 .6284574+01 .7610722+01    1  10
 .1196139+02 .4382476+01 .6068572+01 .1389072+02 .3114451+01 .4295802+01    1  11
 .1577764+02 .1109069+01 .2372769+01 .1766300+02-.8520485-00 .3449206-00    1  12
 .1974175+02-.2290292+01-.1396182+01 .2196855+02-.2926097+01-.2492993+01    1  13
 .2446125+02-.3031407+01-.2964081+01 .2698356+02 .8109302-00 .1300000+02    1  14
 .1081603+02 .1127061+02 .2125871+01 .1043311+02 .1092698+02 .4158320+01    1  15
 .9894502+01 .1048400+02 .6255945+01 .8994347+01 .9760501+01 .8209307+01    1  16
 .7826120+01 .6597733+01 .1001982+02 .6460033+01 .7093483+01 .1172712+02    1  17
 .4895732+01 .5561121+01 .1350190+02 .3302292+01 .4178371+01 .1545487+02    1  18
 .1509122+01 .2574934+01 .1753305+02-.4383967-00 .6161041-00 .1965780+02    1  19
-.1998825+01-.1244514+01 .2186565+02-.2684467+01-.2447268+01 .2419263+02    1  20
-.2761897+01-.2725429+01 .2666489+02 .1223775+01 .1300000+02 .1118321+02    1  21
```

.1140652+02	.2349426+01	.1072803+02	.1092465+02	.4265121+01	.1010077+02	1	22
.1034711+02	.6123947+01	.9236083+01	.9724367+01	.7930385+01	.8031412+01	1	23
.6734171+01	.9745451+01	.6559835+01	.7338132+01	.1155372+02	.4883688+01	1	24
.5700958+01	.1336461+02	.3154596+01	.4016574+01	.1523432+02	.1316202+01	1	25
.2236735+01	.1722006+02	-.5406437-00	.3324853-00	.1935585+02	-.1977503+01	1	26
-.1482876+01	.2152580+02	-.2536409+01	-.2430729+01	.2379889+02	-.2576140+01	1	27
-.2551541+01	.2625035+02	.1609438+01	.1300000+02	.1118015+02	.1135201+02	1	28
.2283024+01	.1065940+02	.1085639+02	.4055462+01	.1003116+02	.1041223+02	1	29
.5909860+01	.9147712+01	.9748118+01	.7749649+01	.7929924+01	.8509815+01	1	30
.9523836+01	.6361976+01	.6997127+01	.1127277+02	.4593325+01	.5298036+01	1	31
.1307581+02	.2760511+01	.3527035+01	.1490215+02	.9143084-00	.1772436+01	1	32
.1603643+02	-.8784557-00	-.4747559-01	.1895192+02	-.2032458+01	-.1673070+01	1	33
.2113054+02	-.2374784+01	-.2247001+01	.2344120+02	-.2400002+01	-.2377201+01	1	34
.2585979+02	.1445910+01	.1300000+02	.1103869+02	.1128431+02	.2120569+01	1	35
.1065994+02	.1082559+02	.3885541+01	.1007326+02	.1036233+02	.5703913+01	1	36
.8983105+01	.9525362+01	.7504749+01	.7391939+01	.8056819+01	.9259812+01	1	37
.5813416+01	.6487555+01	.1095693+02	.4162610+01	.4869974+01	.1273307+02	1	38
.2429996+01	.3169031+01	.1456747+02	.5841134-00	.1648984+01	.1650733+02	1	39
-.1113101+01	-.1934030-00	.1861273+02	-.1984606+01	-.1677085+01	.2082300+02	1	40
-.2180498+01	-.2128034+01	.2315597+02	-.2208191+01	-.2187549+01	.2555217+02	1	41
.2302585+01	.1300000+02	.1075651+02	.1114258+02	.1867030+01	.1042463+02	1	42
.1065211+02	.3619119+01	.9687554+01	.1013437+02	.5412575+01	.8455161+01	1	43
.9166084+01	.7181888+01	.6913274+01	.7725006+01	.8908000+01	.5337100+01	1	44
.6180181+01	.1060253+02	.3761043+01	.4572299+01	.1237943+02	.2067462+01	1	45
.2921227+01	.1423868+02	.2620770-00	.1202723+01	.1619820+02	-.1282984+01	1	46
-.5539767-00	.1828178+02	-.1955246+01	-.1736103+01	.2045891+02	-.2111411+01	1	47
-.2074921+01	.2272516+02	-.2106856+01	-.2089102+01	.2512017+02	.2708050+01	1	48
.1300000+02	.1042645+02	.1087254+02	.1555453+01	.1012282+02	.1045413+02	1	49
.3274187+01	.9359336+01	.9868004+01	.5038345+01	.8152279+01	.8794694+01	1	50
.6792803+01	.6707448+01	.7365477+01	.8524915+01	.5027033+01	.5784758+01	1	51
.1023754+02	.3222437+01	.4069650+01	.1199962+02	.1429640+01	.2278927+01	1	52
.1381409+02	-.2540265-00	.4846126-00	.1572005+02	-.1477104+01	-.1074550+01	1	53
.1774399+02	-.1912190+01	-.1837912+01	.1946877+02	-.1991666+01	-.1973102+01	1	54
.2224185+02	-.1981618+01	-.1963386+01	.2463996+02	.3113515+01	.1300000+02	1	55
.1016987+02	.1059926+02	.1183169+01	.9908774+01	.1023746+02	.2911224+01	1	56
.9162261+01	.9488590+01	.4667065+01	.7830403+01	.8416449+01	.6417956+01	1	57
.6060494+01	.6831161+01	.8116133+01	.4399240+01	.5044372+01	.9779069+01	1	58
.2715164+01	.3346092+01	.1151484+02	.8545856-00	.1627384+01	.1332583+02	1	59
-.7127758-00	-.2096942-01	.1523594+02	-.1574279+01	-.1310207+01	.1731496+02	1	60
-.1636181+01	-.1788077+01	.1949323+02	-.1869334+01	-.1848739+01	.2177201+02	1	61
-.1847118+01	-.1828534+01	.2416829+02	.3526360+01	.1300000+02	.9673393+01	1	62
.1021487+02	.7842700-00	.9302325+01	.9722311+01	.2512413+01	.8437468+01	1	63
.8819445+01	.4241506+01	.7022211+01	.7514131+01	.5952970+01	.5412182+01	1	64
.5996292+01	.7625516+01	.3762871+01	.4471052+01	.9283214+01	.2035740+01	1	65
.2925770+01	.1102161+02	.3927310-00	.1401156+01	.1283562+02	-.9621902-00	1	66
-.2416345-00	.1474576+02	-.1614177+01	-.1387139+01	.1581771+02	-.1768351+01	1	67
-.1717644+01	.1898904+02	-.1761829+01	-.1739670+01	.2126784+02	-.1741500+01	1	68
-.1723130+01	.2365515+02	.3912023+01	.1300000+02	.8781684+01	.9540137+01	1	69
.3501259-00	.8380707+01	.8844833+01	.2080145+01	.7818152+01	.8035299+01	1	70
.3785374+01	.6631651+01	.6907469+01	.5471911+01	.5003031+01	.5394688+01	1	71
.7132158+01	.3318938+01	.3824401+01	.8777334+01	.1562761+01	.2208941+01	1	72
.1050595+02	-.5452760-01	.7037781-00	.1232140+02	-.1189158+01	-.6791542-00	1	73
.1423108+02	-.1616993+01	-.1461125+01	.1631243+02	-.1702270+01	-.1667847+01	1	74
.1848199+02	-.1717654+01	-.1698065+01	.2073445+02	-.1714959+01	-.1696537+01	1	75
.2310370+02	.4248495+01	.1300000+02	.8374504+01	.9119536+01	-.3670743-01	1	76

.7955353+01	.8403555+01	.1669699+01	.7305461+01	.7545360+01	.3367431+01	1	77
.6015473+01	.6307267+01	.5043691+01	.4335021+01	.4834670+01	.6711466+01	1	78
.2657768+01	.3364347+01	.8371573+01	.9922724-00	.1863723+01	.1010828+02	1	79
-.4702221-00	.3560978-00	.1191654+02	-.1339642+01	-.9384294-00	.1380576+02	1	80
-.1637296+01	-.1554678+01	.1565456+02	-.1692503+01	-.1670268+01	.1800238+02	1	81
-.1697033+01	-.1679639+01	.2025108+02	-.1692074+01	-.1673861+01	.2262191+02	1	82
.4605170+01	.1300000+02	.8132264+01	.6774461+01	-.4742928-00	.7659560+01	1	83
.8119758+01	.1224293+01	.6726368+01	.7074926+01	.2929772+01	.5253571+01	1	84
.5715374+01	.4616349+01	.3579362+01	.4256192+01	.6279890+01	.1976084+01	1	85
.2796084+01	.7922685+01	.3004476-00	.1221970+01	.9632374+01	-.9355072-00	1	86
-.2716168-00	.1141434+02	-.1468276+01	-.1274449+01	.1329539+02	-.1629226+01	1	87
-.1603379+01	.1534437+02	-.1670396+01	-.1654410+01	.1749229+02	-.1670810+01	1	88
-.1652653+01	.1974387+02	-.1658519+01	-.1640161+01	.2212064+02	.5010635+01	1	89
.1300000+02	.7798397+01	.8463409+01	-.9729886-00	.7171128+01	.7645609+01	1	90
.7337651-00	.6005249+01	.6400356+01	.2431437+01	.4458303+01	.4951085+01	1	91
.4092206+01	.2630038+01	.3400289+01	.5725316+01	.1237330+01	.1949715+01	1	92
.7349137+01	-.1908639-00	.4420368-00	.9054309+01	-.1114484+01	-.7957196-00	1	93
.1083793+02	-.1507591+01	-.1424406+01	.1272396+02	-.1618670+01	-.1591970+01	1	94
.1477620+02	-.1633726+01	-.1615191+01	.1692739+02	-.1635941+01	-.1617660+01	1	95
.1917136+02	-.1636259+01	-.1617908+01	.2153481+02	.5416100+01	.1300000+02	1	96
.7169671+01	.7680158+01	-.1478467+01	.6398048+01	.6777655+01	.2103261-00	1	97
.5283698+01	.5524455+01	.1081707+01	.3842803+01	.4117313+01	.3522936+01	1	98
.2196957+01	.2662549+01	.5152278+01	.6536860-00	.1291177+01	.6778846+01	1	99
-.6192706-00	-.4717053-01	.8486840+01	-.1315995+01	-.1081499+01	.1026676+02	1	100
-.1560303+01	-.1512211+01	.1214074+02	-.1620557+01	-.1603690+01	.1418134+02	1	101
-.1633224+01	-.1616215+01	.1632146+02	-.1635775+01	-.1617575+01	.1856360+02	1	102
-.1634647+01	-.1616265+01	.2092329+02	.5828946+01	.1300000+02	.6485971+01	1	103
.7164638+01	-.2020273+01	.5743818+01	.6065662+01	-.3510307-00	.4572364+01	1	104
.4862316+01	.1305035+01	.3018316+01	.3440933+01	.2943280+01	.1410736+01	1	105
.1963270+01	.4567636+01	-.1788344-01	.4934111-00	.6162618+01	-.1023618+01	1	106
-.7659538-00	.7877877+01	-.1455303+01	-.1409942+01	.9650443+01	-.1592811+01	1	107
-.1579709+01	.1152403+02	-.1623038+01	-.1605281+01	.1356921+02	-.1625418+01	1	108
-.1607109+01	.1571231+02	-.1625560+01	-.1607206+01	.1795481+02	-.1625606+01	1	109
-.1607213+01	.2031808+02	.6214606+01	.1300000+02	.5696114+01	.6509206+01	1	110
-.2546192+01	.5004352+01	.5475341+01	-.8847567-00	.3710236+01	.4079815+01	1	111
.7573379-00	.2146000+01	.2529256+01	.2382029+01	.6183274-00	.1022840+01	1	112
.3996064+01	-.5969998-00	-.2623209-00	.5608519+01	-.1298963+01	-.1141131+01	1	113
.7306733+01	-.1549958+01	-.1505263+01	.9081477+01	-.1609616+01	-.1591073+01	1	114
.1095400+02	-.1622834+01	-.1605253+01	.1299434+02	-.1625230+01	-.1606981+01	1	115
.1513442+02	-.1625497+01	-.1607167+01	.1737639+02	-.1625488+01	-.1607174+01	1	116
.1973960+02	.6551060+01	.1300000+02	.4885611+01	.5906672+01	-.3010417+01	1	117
.4065351+01	.4664036+01	-.1368047+01	.2739178+01	.3182983+01	.2633801-00	1	118
.1241254+01	.1732974+01	.1683529+01	-.1362693-00	.3733638-00	.3498809+01	1	119
-.1049353+01	-.7611872-00	.5110947+01	-.1455379+01	-.1387366+01	.6805484+01	1	120
-.1587325+01	-.1568787+01	.8577596+01	-.1618862+01	-.1601345+01	.1044943+02	1	121
-.1624058+01	-.1606214+01	.1248965+02	-.1624678+01	-.1606808+01	.1462972+02	1	122
-.1624383+01	-.1606710+01	.1687168+02	-.1624389+01	-.1606717+01	.1923489+02	1	123
.6907755+01	.1300000+02	.3976300+01	.5071525+01	-.3524498+01	.3161274+01	1	124
.3780519+01	-.1890496+01	.1830022+01	.2375006+01	-.2632087-00	.4037475-00	1	125
.9300361-00	.1355011+01	-.7256769-00	-.3921471-00	.2966785+01	-.1343741+01	1	126
-.1232215+01	.4576743+01	-.1566676+01	-.1534618+01	.6270633+01	-.1613353+01	1	127
-.1593832+01	.8042611+01	-.1620612+01	-.1603615+01	.9914417+01	-.1621723+01	1	128
-.1605118+01	.1195464+02	-.1620723+01	-.1604559+01	.1409470+02	-.1620736+01	1	129
-.1604580+01	.1633666+02	-.1620738+01	-.1604582+01	.1869987+02	.7313220+01	1	130
.1300000+02	.2726625+01	.4236279+01	-.4114327+01	.1816488+01	.2863696+01	1	131

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-.2487559+01 .4916208-00 .1406400+01-.8665109-00-.7109438-00-.3023469-01   1 132
 .7482819-00-.1343624+01-.1063698+01 .2358928+01-.1554723+01-.1477731+01   1 133
 .3960017+01-.1605436+01-.1578835+01 .5662449+01-.1615227+01-.1597803+01   1 134
 .7434416+01-.1610080+01-.1601016+01 .9306220+01-.1617008+01-.1601324+01   1 135
 .1134644+02-.1617360+01-.1601740+01 .1348651+02-.1617369+01-.1601747+01   1 136
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-.1617641+01-.1597190+01 .5054253+01-.1620062+01-.1603570+01 .6826219+01   1 141
-.1620482+01-.1604660+01 .8698022+01-.1621991+01-.1606683+01 .1073824+02   1 142
-.1621999+01-.1606704+01 .1287831+02-.1621999+01-.1606707+01 .1512027+02   1 143
-.1622000+01-.1606707+01 .1748348+02 .0000000    .0000000    .0000000      1 144
        3
 DIANE GROUT 1A/INT   LMS/RP    7/27/66
 0.100000+01 0.451000+03
     1119. .1100000E+02
 0.391202+01 0.130000+02 0.822839+01 0.938122+01 0.580303+00 0.775822+01   2   1
 0.851888+01 0.225140+01 0.699491+01 0.756140+01 0.393200+01 0.570923+01   2   2
 0.633831+01 0.558693+01 0.408609+01 0.502435+01 0.724819+01 0.243855+01   2   3
 0.373100+01 0.892230+01 0.879571+00 0.231815+01 0.106719+02-0.413043+00   2   4
 0.899719+00 0.125007+02-0.122521+01-0.438179+00 0.144082+02-0.152967+01   2   5
-0.134152+01 0.164591+02-0.159703+01-0.155974+01 0.186025+02-0.160561+01   2   6
-0.158697+01 0.206469+02-0.160558+01-0.158759+01 0.232127+02 0.424850+01   2   7
 0.130000+02 0.817278+01 0.910955+01 0.135226+00 0.763650+01 0.835636+01   2   8
 0.181433+01 0.669187+01 0.735752+01 0.350207+01 0.516967+01 0.616298+01   2   9
 0.519549+01 0.351475+01 0.482921+01 0.687517+01 0.197751+01 0.344444+01   2  10
 0.854042+01 0.454294+00 0.186079+01 0.102631+02-0.749034+00 0.266418+00   2  11
 0.120442+02-0.136576+01-0.983496+00 0.139197+02-0.154395+01-0.148403+01   2  12
 0.159629+02-0.158673+01-0.157272+01 0.181052+02-0.160009+01-0.158290+01   2  13
 0.203405+02-0.169196+01-0.158370+01 0.227121+02 0.460517+01 0.130000+02   2  14
 0.821224+01 0.906520+01-0.320665+00 0.757157+01 0.834595+01 0.137836+01   2  15
 0.636367+01 0.714930+01 0.308906+01 0.477047+01 0.571876+01 0.477430+01   2  16
 0.304289+01 0.418606+01 0.642134+01 0.142088+01 0.263656+01 0.804365+01   2  17
-0.478165-01 0.102134+01 0.974260+01-0.984571+00-0.443893+00 0.115175+02   2  18
-0.139036+01-0.130379+01 0.133911+02-0.155067+01-0.153955+01 0.154332+02   2  19
-0.158819+01-0.157154+01 0.175782+02-0.158903+01-0.157082+01 0.198262+02   2  20
-0.158397+01-0.156559+01 0.221953+02 0.501064+01 0.130000+02 0.768303+01   2  21
 0.863936+01-0.815487+00 0.695518+01 0.762189+01 0.882302+00 0.571668+01   2  22
 0.626252+01 0.256980+01 0.415298+01 0.474467+01 0.421083+01 0.252637+0:   2  23
 0.320125+01 0.583097+01 0.956173+00 0.162440+01 0.744513+01-0.353912+00   2  24
 0.137029+00 0.914336+01-0.114255+01-0.958824+00 0.109213+02-0.147945+01   2  25
-0.143337+01 0.127991+02-0.156655+01-0.154468+01 0.148429+02-0.157991+01   2  26
-0.156135+01 0.169637+02-0.158177+01-0.156353+01 0.192258+02-0.158213+01   2  27
-0.156376+01 0.215890+02 0.541610+01 0.130000+02 0.663968+01 0.783727+01   2  28
-0.133695+01 0.574430+01 0.651312+01 0.339348+00 0.468137+01 0.520479+01   2  29
 0.198951+01 0.329050+01 0.373397+01 0.361719+01 0.171058+01 0.222976+01   2  30
 0.523609+01 0.241784+00 0.803759+00 0.685234+01-0.877972+00-0.498667+00   2  31
 0.855011+01-0.139702+01-0.126330+01 0.103233+02-0.153897+01-0.151534+01   2  32
 0.121953+02-0.157363+01-0.155742+01 0.142355+02-0.158103+01-0.156303+01   2  33
 0.163756+02-0.158198+01-0.156363+01 0.186177+02-0.158156+01-0.156316+01   2  34
 0.209814+02 0.582895+01 0.130000+02 0.560362+01 0.684958+01-0.189647+01   2  35
 0.495744+01 0.567420+01-0.244075+00 0.375927+01 0.433149+01 0.138805+01   2  36
 0.220023+01 0.285307+01 0.301268+01 0.656770+00 0.132597+01 0.462728+01   2  37
-0.554949+00-0.918363-01 0.623811+01-0.122027+01-0.108322+01 0.793225+01   2  38
```

```
-0.146869+01-0.146298+01 0.970441+01-0.156494+01-0.154620+01 0.115768+02   2  39
-0.157775+01-0.155904+01 0.136184+02-0.157825+01-0.155977+01 0.157599+02   2  40
-0.157773+01-0.155931+01 0.180027+02-0.157761+01-0.155922+01 0.203661+02   2  41
 0.621461+01 0.130000+02 0.474947+01 0.616368+01-0.243538+01 0.399704+01   2  42
 0.489642+01-0.605923+00 0.271158+01 0.346639+01 0.819964+00 0.121437+01   2  43
 0.190661+01 0.243857+01-0.140094+00 0.439701+00 0.405028+01-0.101139+01   2  44
-0.687822+00 0.566092+01-0.142125+01-0.130427+01 0.735613+01-0.154296+01   2  45
-0.150561+01 0.912945+01-0.156984+01-0.154992+01 0.110020+02-0.157632+01   2  46
-0.155617+01 0.130423+02-0.157755+01-0.155912+01 0.151824+02-0.157767+01   2  47
-0.155921+01 0.174244+02-0.157768+01-0.155922+01 0.197876+02 0.655108+01   2  48
 0.130000+02 0.377280+01 0.512106+01-0.292622+01 0.286313+01 0.381031+01   2  49
-0.130262+01 0.150550+01 0.232685+01 0.318607+00 0.152242+00 0.904498+00   2  50
 0.193585+01-0.824680+00-0.294241+00 0.354811+01-0.132061+01-0.110007+01   2  51
 0.515907+01-0.150470+01-0.145349+01 0.685349+01-0.156262+01-0.154295+01   2  52
 0.862560+01-0.157670+01-0.155740+01 0.104974+02-0.157844+01-0.155930+01   2  53
 0.125377+02-0.157863+01-0.155954+01 0.146777+02-0.157865+01-0.155956+01   2  54
 0.169197+02-0.157865+01-0.155957+01 0.192629+02 0.690776+01 0.130000+02   2  55
 0.303909+01 0.443664+01-0.345170+01 0.216863+01 0.307779+01-0.183282+01   2  56
 0.847066+00 0.167674+01-0.213307+00-0.338995+00 0.329761+00 0.140344+01   2  57
-0.109377+01-0.783700+00 0.301480+01-0.144706+01-0.136154+01 0.462473+01   2  58
-0.155821+01-0.152532+01 0.631063+01-0.157901+01-0.155569+01 0.809062+01   2  59
-0.158250+01-0.156080+01 0.996242+01-0.158304+01-0.156161+01 0.120026+02   2  60
-0.156280+01-0.156157+01 0.141427+02-0.158280+01-0.156158+01 0.163847+02   2  61
-0.156209+01-0.156158+01 0.187479+02 0.731322+01 0.130000+02 0.192241+01   2  62
 0.363673+01-0.403322+01 0.111763+01 0.227416+01-0.243646+01-0.415608-01   2  63
 0.884071+00-0.815632+00-0.101458+01-0.422772+00 0.796151+00-0.145010+01   2  64
-0.127758+01 0.240665+01-0.156361+01-0.149968+01 0.401658+01-0.158698+01   2  65
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-0.156861+01 0.935423+01-0.159357+01-0.156890+01 0.113944+02-0.159358+01   2  67
-0.156893+01 0.135345+02-0.159358+01-0.156894+01 0.157765+02-0.159358+01   2  68
-0.156894+01 0.181397+02 0.771869+01 0.130000+02 0.487017+00 0.280601+01   2  69
-0.465669+01-0.426232+00 0.139204+01-0.303429+01-0.113012+01-0.258116-01   2  70
-0.142301+01-0.146748+01-0.105856+01 0.188123+00-0.157334+01-0.146134+01   2  71
 0.179069+01-0.159980+01-0.155740+01 0.340039+01-0.160649+01-0.157825+01   2  72
 0.510225+01-0.160775+01-0.158211+01 0.687422+01-0.160797+01-0.158278+01   2  73
 0.874003+01-0.160800+01-0.158269+01 0.107862+02-0.160801+01-0.158290+01   2  74
 0.129263+02-0.160801+01-0.158290+01 0.151683+02-0.160801+01-0.158290+01   2  75
 0.175315+02 0.          0.          0.          0.          0.            2  76
         47
DIANE/SCAT  H-21A  TEMP(1.-34.)  INPUT TAPE 1505  8-9-67   C1/BCF
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   1001.     .1300000+02                                                   1   0
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 .1256781+02 .7716049-00 .6408479+01 .1235131+02 .3410457+01 .6398309+01   1   2
 .1160596+02 .6302030+01 .6353761+01 .1031355+02 .9337084+01 .6235561+01   1   3
 .9182164+01 .1243225+02 .5926536+01 .6351091+01 .1561595+02 .5092761+01   1   4
 .7438869+01 .1851890+02 .3516669+01 .5970298+01 .2085708+02 .1565718+01   1   5
 .3951492+01 .2299712+02 .1526155-02 .1875272+01 .2515118+02-.7285936-00   1   6
 .5246095-01 .2739483+02-.9031168-00-.7686644-00 .2975822+02 .2231436-00   1   7
 .1300000+02 .8467674+01 .1407222+02 .6875368-00 .8411385+01 .1370490+02   1   8
 .3002995+01 .8404177+01 .1349819+02 .5700993+01 .8371613+01 .1258223+02   1   9
 .8609042+01 .8230326+01 .1145945+02 .1157608+02 .7730864+01 .1035167+02   1  10
 .1435346+02 .6499973+01 .8976269+01 .1673048+02 .4698894+01 .7307882+01   1  11
 .1871530+02 .2706937+01 .5384758+01 .2062999+02 .8366493-00 .3339622+01   1  12
 .2267723+02-.3564432-00 .1231494+01 .2481823+02-.8145785-00-.3242638-00   1  13
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.9969973+01	.1460564+02	.2027567+01	.9867899+01	.1434128+02	.4414648+01	1	15
.9829541+01	.1420250+02	.7133633+01	.9674474+01	.1355649+02	.9967616+01	1	16
.9128746+01	.1212075+02	.1262115+02	.7881585+01	.1043784+02	.1479492+02	1	17
.6074056+01	.8598009+01	.1667227+02	.4070967+01	.6707482+01	.1848422+02	1	18
.2079972+01	.4811438+01	.2036325+02	.3987488-00	.2783635+01	.2240463+02	1	19
-.5173818-00	.8122962-00	.2454465+02	-.8226541-00	-.5384567-00	.2678683+02	1	20
-.8962159-00	-.8732004-00	.2915004+02	.5596158-00	.1300000+02	.1114344+02	1	21
.1499600+02	.2921419+01	.1098783+02	.1469102+02	.5353783+01	.1085761+02	1	22
.1448248+02	.8028749+01	.1042871+02	.1349731+02	.1065670+02	.9336435+01	1	23
.1180634+02	.1289177+02	.7647172+01	.9992114+01	.1472535+02	.5669199+01	1	24
.8129872+01	.1647564+02	.3625969+01	.6258837+01	.1825917+02	.1682282+01	1	25
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.3811136-00	.2431364+02	-.8060146-00	-.6749579-00	.2655560+02	-.9088298-00	1	27
-.8975041-00	.2891881+02	.6931472-00	.1300000+02	.1207682+02	.1515727+02	1	28
.3532864+01	.1184666+02	.1484461+02	.5975409+01	.1156376+02	.1453326+02	1	29
.6544098+01	.1076548+02	.1345803+02	.1090796+02	.9294214+01	.1151112+02	1	30
.1286006+02	.7425489+01	.9565526+01	.1456745+02	.5387038+01	.7678833+01	1	31
.1628393+02	.3350504+01	.5840473+01	.1806033+02	.1454748+01	.3889681+01	1	32
.1993291+02	.6093553-01	.1892067+01	.2197326+02	-.5635074-00	.1153726+00	1	33
.2411334+02	-.8141273-00	-.7605397-00	.2635530+02	-.9183732-00	-.7051625-00	1	34
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.1092740+02	.1294453+02	.1094042+02	.9224350+01	.1103422+02	.1274547+02	1	37
.7285324+01	.9163704+01	.1440501+02	.5229135+01	.7335376+01	.1611000+02	1	38
.3211647+01	.5467929+01	.1780413+02	.1357058+01	.3584733+01	.1975631+02	1	39
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.1154369+02	.1052793+02	.8445576+01	.9585485+01	.1217843+02	.6530863+01	1	44
.7789257+01	.1379713+02	.4536551+01	.6020512+01	.1549290+02	.2602776+01	1	45
.4174770+01	.1726523+02	.9470319-00	.2316892+01	.1913710+02	-.1910004-00	1	46
.4672740-00	.2117733+02	-.7984956-00	-.6934751-00	.2331740+02	-.9146724-00	1	47
-.8967050-00	.2555936+02	-.9222352-00	-.9098682-00	.2792257+02	.1609438+01	1	48
.1300000+02	.1213872+02	.1411128+02	.4703821+01	.1118567+02	.1304370+02	1	49
.6534855+01	.9956322+01	.1177247+02	.8288708+01	.8538253+01	.1009192+02	1	50
.9977585+01	.6983167+01	.8353637+01	.1160634+02	.5368984+01	.6671662+01	1	51
.1321999+02	.3651708+01	.4914319+01	.1491466+02	.1869347+01	.3131350+01	1	52
.1668678+02	.2252389-00	.1311072+01	.1855862+02	-.6838911-00	-.3007359-00	1	53
.2059884+02	-.9012138-00	-.8539384-00	.2273891+02	-.9246463-00	-.9097577-00	1	54
.2498087+02	-.9267774-00	-.9148126-00	.2734408+02	.1945910+01	.1300000+02	1	55
.1078328+02	.1325089+02	.4307550+01	.9652667+01	.1205634+02	.6112519+01	1	56
.8330113+01	.1068231+02	.7810545+01	.6883050+01	.9068062+01	.9479774+01	1	57
.5336950+01	.7400938+01	.1110318+02	.3752441+01	.5733947+01	.1271560+02	1	58
.2072567+01	.4021961+01	.1441301+02	.4702737-00	.2259425+01	.1618209+02	1	59
-.5144508-00	.5034863-00	.1805391+02	-.8609523-00	-.6659882-00	.2009413+02	1	60
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.9675961+01	.7321083+01	.5390349+01	.8096232+01	.8947778+01	.3832869+01	1	64
.6445341+01	.1056884+02	.2246791+01	.4813559+01	.1218073+02	.6737954-00	1	65
.3114088+01	.1387503+02	-.3851081-00	.1370342+01	.1564708+02	-.8065576-00	1	66
-.1779057-00	.1751890+02	-.9215799-00	-.8445324-00	.1955912+02	-.9421034-00	1	67
-.9311889-00	.2169919+02	-.9451977-00	-.9415019-00	.2394115+02	-.9454626-00	1	68

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 .3383927+01 .6017186+01 .9447276+01 .5097425+01 .4545505+01 .7975594+01   1  70
 .6716620+01 .3012703+01 .6442744+01 .8341189+01 .1462139+01 .4874298+01   1  71
 .9961012+01 .1505761-00 .3292199+01 .1157261+02-.5941134-00 .1614041+01   1  72
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 .2213557+01 .5660253+01 .7733817+01 .7371013-00 .4083787+01 .9353006+01   1  78
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-.9599785-00-.9562534-00 .1834273+02-.9614950-00-.9677409-00 .2048279+02   1  81
-.9616261-00-.9687905-00 .2272475+02-.9616408-00-.9689037-00 .2508796+02   1  82
 .3526360+01 .1300000+02 .5876213+01 .9322009+01 .2192666+01 .4496232+01   1  83
 .7940029+01 .3882408+01 .2965564+01 .6409298+01 .5495526+01 .1422545+01   1  84
 .4646445+01 .7115016+01 .1304316-00 .3264477+01 .8733848+01-.5791353-00   1  85
 .1681262+01 .1034521+02-.6541782-00 .1807733-00 .1203939+02-.9358236-00   1  86
-.7068411-00 .1361142+02-.9565692-00-.9314541-00 .1568324+02-.9609509-00   1  87
-.9643707-00 .1772346+02-.9615414-00-.9683745-00 .1986352+02-.9615996-00   1  88
-.9666348-00 .2210549+02-.9616059-00-.9686843-00 .2446869+02 .0000000      1  89
          9
DIANE/SCAT  HMX/LO-HI/JP2 10 FREQ. TEMP.(1.-2250.) C1/JP  12-9-66 000000
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      1111. .2100000E+02
 .0000000     .1300000+02 .5567853+01 .9683676+01-.2706865+01 .5332093+01   1   1
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 .1501667+01 .2065028+02-.2361407+01-.6170555-00 .2260174+02-.3073958+01   1   6
-.2366608+01 .2504944+02-.3196720+01-.3084828+01 .2744771+02 .4054651-00   1   7
 .1300000+02 .6466753+01 .1150226+02 .2827406-00 .6347651+01 .1128156+02   1   8
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 .2017696+02-.1897635+01-.8705626-00 .2247731+02-.2565535+01-.2168465+01   1  13
 .2487339+02-.2715251+01-.2646692+01 .2732272+02 .8109302-00 .1300000+02   1  14
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 .9744139+01 .1144796+02 .6638821+01 .6638196+01 .1026933+02 .8662975+01   1  16
 .7265642+01 .8736610+01 .1042706+02 .5993882+01 .7250810+01 .1211277+02   1  17
 .4722056+01 .5891762+01 .1393162+02 .3229237+01 .4444622+01 .1588530+02   1  18
 .1481314+01 .2710816+01 .1789342+02-.4262241-00 .7281843-00 .1998670+02   1  19
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-.2420933+01-.2379547+01 .2701467+02 .1223775+01 .1300000+02 .1185674+02   1  21
 .1224078+02 .2615303+01 .1128630+02 .1163582+02 .4630421+01 .1039386+02   1  22
 .1095875+02 .6533866+01 .9260496+01 .1011607+02 .8344376+01 .7805722+01   1  23
 .8945637+01 .1015294+02 .6125170+01 .7569366+01 .1191833+02 .4524643+01   1  24
 .5686208+01 .1369941+02 .3056598+01 .4200198+01 .1556433+02 .1417715+01   1  25
 .2541288+01 .1756395+02-.3469661-00 .7013922-00 .1970293+02-.1673557+01   1  26
-.1038019+01 .2190719+02-.2117996+01-.1960984+01 .2423318+02-.2146422+01   1  27
-.2114424+01 .2668422+02 .1609438+01 .1300000+02 .1186155+02 .1197807+02   1  28
 .2615972+01 .1131619+02 .1141228+02 .4444469+01 .1039210+02 .1091041+02   1  29
 .6304232+01 .9052361+01 .1013347+02 .8120040+01 .7678286+01 .8906221+01   1  30
```

.9874197+01	.6191330+01	.7456023+01	.1162134+02	.4645177+01	.5605869+01	1	31
.1343159+02	.2998671+01	.4111540+01	.1529435+02	.1225938+01	.2375349+01	1	32
.1726642+02	-.5453751-00	.4763011-00	.1930427+02	-.1598045+01	-.1129208+01	1	33
.2158523+02	-.1908789+01	-.1818473+01	.2390064+02	-.1955996+01	-.1933816+01	1	34
.2630235+02	.1945910+01	.1300000+02	.1160069+02	.1184441+02	.2453113+01	1	35
.1114670+02	.1134536+02	.4260273+01	.1029947+02	.1084687+02	.6076226+01	1	36
.9044088+01	.1016067+02	.7872432+01	.7607991+01	.8884402+01	.9632226+01	1	37
.6167291+01	.7251658+01	.1136011+02	.4508188+01	.5543965+01	.1315939+02	1	38
.2805352+01	.3799864+01	.1500820+02	.9623917-00	.2149405+01	.1695831+02	1	39
-.7327947-00	.2564504-00	.1905068+02	-.1596977+01	-.1270970+01	.2122709+02	1	40
-.1840802+01	-.1790227+01	.2350303+02	-.1884965+01	-.1866475+01	.2587431+02	1	41
.2302585+01	.1300000+02	.1114084+02	.1162523+02	.2226724+01	.1090523+02	1	42
.1120605+02	.4009446+01	.1018506+02	.1074379+02	.5798290+01	.9004391+01	1	43
.9820487+01	.7587052+01	.7469552+01	.8373610+01	.9330880+01	.5949007+01	1	44
.6795897+01	.1103743+02	.4239917+01	.5075676+01	.1280821+02	.2347061+01	1	45
.3272844+01	.1462885+02	.5153067-00	.1419054+01	.1653794+02	-.1024217+01	1	46
-.3850085-00	.1859234+02	-.1690548+01	-.1538872+01	.2073475+02	-.1856261+01	1	47
-.1834417+01	.2297700+02	-.1886996+01	-.1870670+01	.2534024+02	.2708050+01	1	48
.1300000+02	.1036803+02	.1133337+02	.1925637+01	.1026439+02	.1093082+02	1	49
.3680444+01	.9787560+01	.1034430+02	.5446563+01	.8692871+01	.9178924+01	1	50
.7200280+01	.7143173+01	.7609196+01	.8906531+01	.5387888+01	.5931046+01	1	51
.1057186+02	.3484651+01	.4085391+01	.1229324+02	.1576635+01	.2197183+01	1	52
.1407299+02	-.1806356-00	.3479397-00	.1594631+02	-.1361369+01	-.1162190+01	1	53
.1798681+02	-.1776279+01	-.1761463+01	.2012715+02	-.1873048+01	-.1859619+01	1	54
.2237122+02	-.1875901+01	-.1857968+01	.2474737+02	.3113515+01	.1300000+02	1	55
.9339066+01	.1088741+02	.1538040+01	.9138222+01	.1040459+02	.3277310+01	1	56
.8685861+01	.9524625+01	.5005687+01	.7656240+01	.8074916+01	.6717686+01	1	57
.6095369+01	.6364774+01	.6373423+01	.4313686+01	.4614061+01	.9996850+01	1	58
.2497730+01	.2822307+01	.1164450+02	.7266390-00	.1051447+01	.1347000+02	1	59
-.7731763-00	-.5010479-00	.1535318+02	-.1590525+01	-.1489870+01	.1740923+02	1	60
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-.1773670+01	-.1754620+01	.2424263+02	.3526360+01	.1300000+02	.8438820+01	1	62
.1020515+02	.1070421+01	.7897979+01	.9538276+01	.2790582+01	.7037407+01	1	63
.8357942+01	.4476888+01	.5776551+01	.6762639+01	.6141239+01	.4283482+01	1	64
.5144066+01	.7774472+01	.2711069+01	.3579742+01	.9401716+01	.1098364+01	1	65
.2015205+01	.1111294+02	-.3144808-00	.5969265-00	.1291205+02	-.1257276+01	1	66
-.6308148-00	.1482847+02	-.1642635+01	-.1439409+01	.1690896+02	-.1684749+01	1	67
-.1631191+01	.1909005+02	-.1649479+01	-.1626772+01	.2138180+02	-.1629105+01	1	68
-.1610395+01	.2376794+02	.3912023+01	.1300000+02	.8075020+01	.9501185+01	1	69
.5984646-00	.7207630+01	.8568968+01	.2273551+01	.6051309+01	.7390264+01	1	70
.3946803+01	.4638181+01	.6036715+01	.5604687+01	.3133025+01	.4747384+01	1	71
.7254445+01	.1735095+01	.3515565+01	.8910032+01	.4354815-00	.2184108+01	1	72
.1064913+02	-.6487027-00	.8312922-00	.1247645+02	-.1312961+01	-.5039025-00	1	73
.1439036+02	-.1533206+01	-.1292778+01	.1646254+02	-.1575726+01	-.1525933+01	1	74
.1862201+02	-.1584770+01	-.1564433+01	.2086777+02	-.1587016+01	-.1568762+01	1	75
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.4332414+01	.5940937+01	.5184673+01	.2893472+01	.4719791+01	.6858333+01	1	78
.1439127+01	.3415748+01	.8524723+01	.1532978-00	.1958003+01	.1025913+02	1	79
-.8171821-00	.4233204-00	.1205794+02	-.1347735+01	-.8672393-00	.1393921+02	1	80
-.1524480+01	-.1443579+01	.1598125+02	-.1571356+01	-.1553913+01	.1812156+02	1	81
-.1584934+01	-.1567812+01	.2036355+02	-.1587490+01	-.1569133+01	.2272676+02	1	82
.4605170+01	.1300000+02	.8326673+01	.9033696+01	-.3190003-00	.7245427+01	1	83
.8217233+01	.1373686+01	.5847904+01	.7042311+01	.3079070+01	.4271624+01	1	84
.5708551+01	.4766030+01	.2701407+01	.4284111+01	.6424558+01	.1213404+01	1	85

.2758472+01	.8058874+01	-.1196110+00	.1119752+01	.9780446+01	-.9908075-00	1	86
-.3687856-00	.1153413+02	-.1381371+01	-.1268404+01	.1340624+02	-.1538987+01	1	87
-.1528808+01	.1544651+02	-.1583352+01	-.1565697+01	.1758658+02	-.1582166+01	1	88
-.1569240+01	.1982654+02	-.1588597+01	-.1569556+01	.2219175+02	.5010635+01	1	89
.1300000+02	.7913150+01	.8705398+01	-.8235757-00	.7065468+01	.7720151+01	1	90
.8806828-00	.5756985+01	.6405389+01	.2574275+01	.4111116+01	.4855051+01	1	91
.4224895+01	.2447223+01	.3247998+01	.5847118+01	.9167996-00	.1645580+01	1	92
.7459717+01	-.3457967-00	.1039364+00	.9154181+01	-.1163162+01	-.1047584+01	1	93
.1092627+02	-.1520427+01	-.1492542+01	.1279809+02	-.1585227+01	-.1563120+01	1	94
.1463832+02	-.1592202+01	-.1575911+01	.1697838+02	-.1593029+01	-.1571882+01	1	95
.1922035+02	-.1593115+01	-.1571979+01	.2158355+02	.5416100+01	.1300000+02	1	96
.8579810+01	.7989555+01	-.1337703+01	.5726961+01	.6752095+01	.3479772-00	1	97
.4468865+01	.5255652+01	.2003092+01	.2924567+01	.3635909+01	.3628497+01	1	98
.1342827+01	.2038721+01	.5241869+01	-.1215230+00	.5019209-00	.6852131+01	1	99
-.1144080+01	-.6354080-00	.6548098+01	-.1521503+01	-.1444731+01	.1031809+02	1	100
-.1592152+01	-.1561564+01	.1218790+02	-.1601572+01	-.1577527+01	.1423012+02	1	101
-.1602663+01	-.1579402+01	.1637019+02	-.1602794+01	-.1579692+01	.1861215+02	1	102
-.1602808+01	-.1579717+01	.2097536+02	.5826946+01	.1300000+02	.4835123+01	1	103
.5965570+01	-.1892448+01	.3705835+01	.5610145+01	-.2386504-00	.2391829+01	1	104
.4095704+01	.1392852+01	.8909629-00	.2511106+01	.3011541+01	-.4341810-00	1	105
.9461857-00	.4623064+01	-.1205284+01	-.4595453-00	.6232959+01	-.1517958+01	1	106
-.1325403+01	.7926648+01	-.1599932+01	-.1553678+01	.9698826+01	-.1614031+01	1	107
-.1589106+01	.1157033+02	-.1616276+01	-.1594543+01	.1361085+02	-.1616573+01	1	108
-.1595255+01	.1575092+02	-.1616609+01	-.1595340+01	.1799288+02	-.1616612+01	1	109
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-.2436771+01	.2076225+01	.4005701+01	-.8035088-00	.6385278-00	.3077332+01	1	111
.6167183-00	-.5902500-00	.1504690+01	.2433642+01	-.1264514+01	-.2902[illegible]-02	1	112
.4044698+01	-.1520680+01	-.1095968+01	.5654491+01	-.1663531+01	-.1513262+01	1	113
.7346360+01	-.1624962+01	-.1597600+01	.9120333+01	-.1628799+01	-.1610777+01	1	114
.1099214+02	-.1629430+01	-.1612831+01	.1303236+02	-.1629514+01	-.1613101+01	1	115
.1517243+02	-.1629524+01	-.1613133+01	.1741439+02	-.1629525+01	-.1613137+01	1	116
.1977760+02	.6551080+01	.1300000+02	.2011095+01	.5022184+01	-.2922120+01	1	117
.6401004-00	.3551437+01	-.1304740+01	-.5666340-00	.2012157+01	.3130002-00	1	118
-.1255116+01	.4755807-00	.1929165+01	-.1523954+01	-.6122377-00	.3540040+01	1	119
-.1608489+01	-.1437154+01	.5149793+01	-.1632816+01	-.1595436+01	.6843653+01	1	120
-.1636719+01	-.1624539+01	.8615625+01	-.1639774+01	-.1629432+01	.1048743+02	1	121
-.1639749+01	-.1630210+01	.1252765+02	-.1639972+01	-.1630313+01	.1466772+02	1	122
-.1639975+01	-.1630325+01	.1690768+02	-.1639975+01	-.1630320+01	.1927289+02	1	123
.6907755+01	.1300000+02	.5441500-00	.3519182+01	-.3451962+01	-.6255840-00	1	124
.2413614+01	-.1837712+01	-.1280255+01	.9019135-00	-.2205543-00	-.1637885+01	1	125
-.4817998-00	.1394287+01	-.1620058+01	-.1327426+01	.3005057+01	-.1647577+01	1	126
-.1842526+01	.4614767+01	-.1653716+01	-.1666122+01	.6308642+01	-.1655406+01	1	127
-.1869643+01	.8080613+01	-.1655568+01	-.1670103+01	.9952418+01	-.1655594+01	1	128
-.1670175+01	.1199264+02	-.1655597+01	-.1670184+01	.1413271+02	-.1655598+01	1	129
-.1670185+01	.1637467+02	-.1655598+01	-.1670185+01	.1873787+02	.7313220+01	1	130
.1300000+02	-.1100534+00	.2764936+01	-.4056983+01	-.1025058+01	.1261809+01	1	131
-.2442720+01	-.1446401+01	-.1949775-00	-.8266431-00	-.1594117+01	-.1238317+01	1	132
.7861754-00	-.1639371+01	-.1598021+01	.2396878+01	-.1651775+01	-.1659472+01	1	133
.4006594+01	-.1654636+01	-.1668476+01	.5700445+01	-.1655512+01	-.1669946+01	1	134
.7472416+01	-.1655583+01	-.1670148+01	.9344220+01	-.1655594+01	-.1670180+01	1	135
.1138444+02	-.1655596+01	-.1670184+01	.1352451+02	-.1655596+01	-.1670184+01	1	136
.1576647+02	-.1655596+01	-.1670164+01	.1812968+02	.7718685+01	.1300000+02	1	137
-.6469347-00	.1999573+01	-.4663447+01	-.1288272+01	.5037347-00	-.3046381+01	1	138
-.1542159+01	-.8118785-00	-.1434851+01	-.1623831+01	-.1487158+01	.1780276-00	1	139
-.1647668+01	-.1642982+01	.1788692+01	-.1653808+01	-.1665805+01	.3398398+01	1	140

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-.1655342+01-.1669521+01 .5092248+01-.1655556+01-.1670074+01 .6864218+01   1 141
-.1655580+01-.1670164+01 .6736022+01-.1655593+01-.1670178+01 .1077624+02   1 142
-.1655594+01-.1670180+01 .1291631+02-.1655594+01-.1670180+01 .1515827+02   1 143
-.1655594+01-.1670180+01 .1752148+02 .0000000    .0000000    .0000000      1 144
        14
DIANE/SLAT  LIN/XTRAH1-10A  30 FREQ.  TEMP(50.-22500.)  CI/ML  1/1000000
 .1000000+02 .6970000+03
      1106. .1700000+02
 .3912023+01 .1300000+02 .7670779+01 .9793608+01 .9026840-00 .6605788+01   1   1
 .8589481+01 .2564496+01 .5267976+01 .7010211+01 .4231161+01 .3769586+01   1   2
 .5389453+01 .5863943+01 .2198304+01 .3731792+01 .7478350+01 .6283974-00   1   3
 .2123576+01 .9089196+01-.7029054-00 .4881980-00 .1078327+02-.1382526+01   1   4
-.9124451-00 .1255528+02-.1582575+01-.1497894+01 .1442709+02-.1615618+01   1   5
-.1589713+01 .1646731+02-.1619615+01-.1600251+01 .1860738+02-.1620030+01   1   6
-.1601409+01 .2084934+02-.1620074+01-.1601534+01 .2321255+02 .4248495+01   1   7
 .1300000+02 .6360556+01 .6966270+01 .4653230-00 .5131334+01 .7667334+01   1   8
 .2098646+01 .3696263+01 .6073066+01 .3736503+01 .2202030+01 .4476133+01   1   9
 .5360647+01 .6576491-00 .2856192+01 .6973946+01-.6107952-00 .1261854+01   1  10
 .8584550+01-.1307592+01-.2905224-00 .1027857+02-.1556612+01-.1311025+01   1  11
 .1205057+02-.1618539+01-.1573633+01 .1392238+02-.1629237+01-.1611358+01   1  12
 .1596261+02-.1630751+01-.1616189+01 .1810267+02-.1630978+01-.1616767+01   1  13
 .2034463+02-.1630958+01-.1616829+01 .2270784+02 .4605170+01 .1300000+02   1  14
 .5118427+01 .6080620+01-.4775553-01 .3765739+01 .6683684+01 .1574416+01   1  15
 .2311951+01 .5149721+01 .3204099+01 .8131442-00 .3558921+01 .4026319+01   1  16
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-.1640529+01-.1632173+01 .1756766+02-.1640590+01-.1632413+01 .1980962+02   1  20
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 .6240157+01-.6434634-00 .1759400+01 .4765396+01 .9711713-00 .2944063-00   1  22
 .3244543+01 .2597323+01-.8207614-00 .1692116+01 .4218493+01-.1376034+01   1  23
 .1520075-00 .5830964+01-.1573391+01-.1061996+01 .7441388+01-.1635117+01   1  24
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 .2745502-00 .3222141+01-.2349755-00-.8398721-00 .1655421+01 .1379347+01   1  36
-.1302854+01 .1211563+00 .2991342+01-.1575230+01-.1077792+01 .4603571+01   1  37
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 .6214608+01 .1300000+02 .9852841-00 .3982097+01-.2437751+01-.3351506-00   1  42
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 .1908242+01-.1630632+01-.1541308+01 .3520393+01-.1649832+01-.1652095+01   1  51
 .5130741+01-.1654475+01-.1667841+01 .6824706+01-.1655550+01-.1670275+01   1  52
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-.1642330+01-.1615779+01 .2985367+01-.1652754+01-.1662612+01 .4595730+01   1  58
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-.1655685+01-.1670632+01 .9933494+01-.1655694+01-.1670658+01 .1197372+02   1  60
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-.1655696+01-.1670662+01 .1871895+02 .7313220+01 .1300000+02-.7342393-00   1  62
 .1850243+01-.4082580+01-.1331164+01 .3409584-00-.2455188+01-.1558805+01   1  63
-.9427587-00-.8465657-00-.1629296+01-.1528924+01 .7658790-00-.1649264+01   1  64
-.1650058+01 .2377554+01-.1654256+01-.1667282+01 .3987533+01-.1655518+01   1  65
-.1670168+01 .5061497+01-.1655564+01-.1670577+01 .7453488+01-.1655690+01   1  66
- 1670648+01 .9325296+01-.1655694+01-.1670660+01 .1136552+02-.1655695+01   1  67
- 1670661+01 .1350558+02-.1655695+01-.1670661+01 .1574754+02-.1655695+01   1  68
-.1670661+01 .1811075+02 .7718085+01 .1300000+02-.1095232+01 .1088755+01   1  69
-.4667628+01-.1477261+01-.3722407-00-.3063293+01-.1604816+01-.1329909+01   1  70
-.1454720+01-.1642578+01-.1617035+01 .1576 29-00-.1652808+01-.1662764+01   1  71
 .1769359+01-.1655116+01-.1669300+01 .3379336+01-.1655615+01-.1670443+01   1  72
 .5073299+01-.1655681+01-.1670625+01 .6845291+01-.1655693+01-.1670656+01   1  73
 .8717099+01-.1655695+01-.1670661+01 .1075732+02-.1655695+01-.1670662+01   1  74
 .1289739+02-.1655695+01-.1670662+01 .1513935+02-.1655695+01-.1670662+01   1  75
 .1750256+02 .8131531+01 .1300000+02-.1339639+01 .3067636-00-.5288154+01   1  76
-.1561249+01-.9611407-00-.3683761+01-.1629958+01-.1534490+01-.2075224+01   1  77
-.1649511+01-.1651010+01-.4626261-00-.1654305+01-.1667436+01 .1148835+01   1  78
-.1655513+01-.1670173+01 .2758810+01-.1655663+01-.1670595+01 .4452773+01   1  79
-.1655693+01-.1670674+01 .6224764+01-.1655696+01-.1670687+01 .8096572+01   1  80
-.1655699+01-.1670690+01 .1013679+02-.1655699+01-.1670690+01 .1227686+02   1  81
-.1655699+01-.1670690+01 .1451862+02-.1655699+01-.1670690+01 .1688203+02   1  82
 .8517193+01 .1300000+02-.1476004+01 .2071814-01-.5866648+01-.1603735+01   1  83
-.1094321+01-.4262221+01-.1641224+01-.1541305+01-.2649787+01-.1651591+01   1  84
-.1639305+01-.1639540+01-.1654023+01-.1657307+01 .5703422-00-.1654551+01   1  85
-.1660726+01 .2180317+01-.1654630+01-.1661390+01 .3874279+01-.1654646+01   1  86
-.1661514+01 .5646270+01-.1654648+01-.1661535+01 .7518078+01-.1654649+01   1  87
-.1661539+01 .9558300+01-.1654649+01-.1661539+01 .1169837+02-.1654649+01   1  88
-.1661539+01 .1394033+02-.1654649+01-.1661539+01 .1630354+02 .0853665+01   1  89
 .1300000+02-.1547760+01-.5159[illegible]-.6371356+01-.1625090+01-.1354169+01   1  90
-.4766911+01-.1647152+01-.1602187+01-.3154489+01-.1652928+01-.1650378+01   1  91
-.1544245+01-.1654406+01-.1659473+01 .6563459-01-.1654597+01-.1661125+01   1  92
 .1675609+01-.1654638+01-.1661461+01 .3369571+01-.1654646+01-.1661524+01   1  93
 .5141562+01-.1654647+01-.1661535+01 .7013370+01-.1654647+01-.1661536+01   1  94
 .9053592+01-.1654647+01-.1661537+01 .1119366+02-.1654647+01-.1661537+01   1  95
 .1343562+02-.1654647+01-.1661537+01 .1579883+02 .9210340+01 .1300000+02   1  96
-.1593715+01-.9944575-00-.6906369+01-.1638783+01-.1517358+01-.5301911+01   1  97
-.1651098+01-.1635384+01-.3689497+01-.1654197+01-.1657137+01-.2079256+01   1  98
-.1654902+01-.1651275+01-.4693774-00-.1654998+01-.1662036+01 .1140596+01   1  99
-.1655018+01-.1662190+01 .2834558+01-.1655022+01-.1662218+01 .4606550+01   1 100
-.1655023+01-.1662223+01 .6476358+01-.1655023+01-.1662224+01 .8518579+01   1 101
-.1655023+01-.1662224+01 .1065865+02-.1655023+01-.1662224+01 .1290061+02   1 102
```

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-.1655023+01-.1662224+01 .1526362+02 .9615885+01 .1300000+02-.1623135+01   1 103
-.1332778+01-.7514500+01-.166[illegible]7+01-.1599187+01-.5910099+01-.1653051+01   1 104
-.1650101+01-.4[illegible]+01-.16[illegible]+01-.1659799+01-.2667453+01-.1654878+01   1 105
-.1661[illegible]+01-.1677[illegible]+01-.165[illegible]+01-.16[illegible]+01 .[illegible]-00-.1654930+01   1 106
-.1661955+01 .2220561+01-.1654931+01-.1661967+01 .3[illegible]+01-.1654932+01   1 107
-.1661969+01 .5670100+01-.1654932+01-.1661970+01 .7910382+01-.1654932+01   1 108
-.1661970+01 .1005045+02-.1654932+01-.1661970+01 .1229241+02-.1654932+01   1 109
-.1661970+01 .1465502+02 .1007127+02 .1300000+02-.1638572+01-.1612360+01   1 110
-.8122764+01-.1650088+01-.1634242+01-.6518242+01-.1653881+01-.1656842+01   1 111
-.4904670+01-.1654561+01-.1660592+01-.3295649+01-.1664077+01-.1661385+01   1 112
-.1685772+01-.1654695+01-.1661529+01-.7579061-01-.1654698+01-.1661550+01   1 113
 .1610163+01-.1654699+01-.1661561+01 .3390154+01-.1654699+01-.1661562+01   1 114
 .5261962+01-.1654699+01-.1661562+01 .7302184+01-.1654699+01-.1661562+01   1 115
 .9442251+01-.1654699+01-.1661562+01 .1168421+02-.1654699+01-.1661562+01   1 116
 .1404742+02 .0000000    .0000000    .0000000    .0000000    .0000000      1 117
       111
  DIANE LIN/HI  SO. EV - 2250. EV  11 FREQ.  CHO/GAL  9/30/66  [illegible]
 .1100000+02 .5150000+03
     2108. .1300000E+02
 .3912023+01 .1300000+02 .7670779+01 .9793608+01 .9026840-00 .6605787+01   1   1
 .8589481+01 .2584496+01 .5267976+01 .7010212+01 .4231161+01 .3769586+01   1   2
 .5389464+01 .5863943+01 .2198236+01 .3731793+01 .7478350+01 .6075961-00   1   3
 .2123568+01 .9089196+01-.1032266+01 .4852223-00 .1078327+02-.2576200+01   1   4
-.1010268+01 .1255526+02-.3652110+01-.1936675+01 .1442769+02-.4024813+01   1   5
-.2213703+01 .1646731+02-.4086486+01-.2256559+01 .1860738+02-.4094103+01   1   6
-.2261769+01 .2084934+02-.4094926+01-.2262354+01 .2321255+02 .4248495+01   1   7
 .1300000+02 .6360555+01 .8966270+01 .4653230-00 .5131334+01 .7667335+01   1   8
 .2096846+01 .3690263+01 .6073667+01 .3736503+01 .2201941+01 .4476133+01   1   9
 .5360647+01 .6340063-00 .2856188+01 .6973946+01-.9443694-00 .1260578+01   1  10
 .8584550+01-.2550517+01-.3504131-00 .1027057+02-.3471523+01-.1732668+01   1  11
 .1205057+02-.4754463+01-.2461847+01 .1392238+02-.4963186+01-.2648407+01   1  12
 .1596261+02-.4994294+01-.2675960+01 .1810267+02-.4998067+01-.2679286+01   1  13
 .2034463+02-.4998474+01-.2679645+01 .2270784+02 .4605170+01 .1300000+02   1  14
 .5118427+01 .8080620+01-.4775553-01 .3765739+01 .6683890+01 .1574416+01   1  15
 .2311900+01 .5149722+01 .3204099+01 .7972127-00 .3558921+01 .4826319+01   1  16
-.7776048-00 .1955142+01 .6439079+01-.2352157+01 .3680257-00 .8049568+01   1  17
-.3913435+01-.1200052+01 .9743564+01-.5155346+01-.2443619+01 .1151556+02   1  18
-.5713957+01-.3002142+01 .1338737+02-.5840099+01-.3128414+01 .1542759+02   1  19
-.5857992+01-.3146340+01 .1756766+02-.5860147+01-.3148498+01 .1980962+02   1  20
-.5860379+01-.3148731+01 .2217263+02 .5010635+01 .1300000+02 .3233510+01   1  21
 .6240158+01-.6434634-00 .1756730+01 .4765396+01 .9711713-00 .2377816-00   1  22
 .3244532+01 .2597323+01-.1316611+01 .1690548+01 .4218403+01-.2900287+01   1  23
 .1088753+00 .5830964+01-.4472719+01-.1453981+01 .7441388+01-.6015867+01   1  24
-.2953809+01 .9135370+01-.7188579+01-.4012917+01 .1090736+02-.7678364+01   1  25
-.4408943+01 .1277917+02-.7783761+01-.4488975+01 .1481940+02-.7798529+01   1  26
-.4500625+01 .1695946+02-.7800303+01-.4501350+01 .1920142+02-.7800495+01   1  27
-.4501493+01 .2156463+02 .5416100+01 .1300000+02 .2488027+01 .5494681+01   1  28
-.1245313+01 .9802900-00 .3986983+01 .3652303-00-.5403322-00 .2466547+01   1  29
 .1998226+01-.2118488+01 .8893048-00 .3610494+01 .3698772+01-.6865394-00   1  30
 .5222812+01-.5238446+01-.2205964+01 .6833200+01-.6635899+01-.3528559+01   1  31
 .8527174+01-.7481913+01-.4254589+01 .1029917+02-.7744371+01-.4459304+01   1  32
 .1217098+02-.7793034+01-.4495919+01 .1421120+02-.7799632+01-.4500849+01   1  33
 .1635126+02-.7800421+01-.4501438+01 .1859322+02-.7800506+01-.4501502+01   1  34
 .2095643+02 .5828946+01 .1300000+02 .1711744+01 .4718412+01-.1861091+01   1  35
 .2153759-00 .3222130+01-.2349755-00-.1353479+01 .1653699+01 .1379347+01   1  36
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-.2934470+01 .7477301-01 .2991342+01-.4501124+01-.1482050+01 .4603571+01   1  37
-.5968822+01-.2909254+01 .6213938+01-.7124545+01-.3958582+01 .7907907+01   1  38
-.7646359+01-.4385795+01 .9679300+01-.7775538+01-.4482805+01 .1155171+02   1  39
-.7797232+01-.4499057+01 .1359193+02-.7800128+01-.4501220+01 .1573200+02   1  40
-.7800473+01-.4501478+01 .1797396+02-.7800511+01-.4501505+01 .2033717+02   1  41
 .6214608+01 .1300000+02 .9754031-00 .3982122+01-.2437751+01-.5385135-00   1  42
 .2468390+01-.8128847-00-.2114907+01 .8929052-00 .8010684-00-.3693213+01   1  43
-.6610010-00 .2412914+01-.5228915+01-.2196674+01 .4025093+01-.6568900+01   1  44
-.3467782+01 .5635448+01-.7431179+01-.4213687+01 .7329414+01-.7727266+01   1  45
-.4446312+01 .9101406+01-.7780888+01-.4492799+01 .1097321+02-.7798995+01   1  46
-.4500356+01 .1301344+02-.7800336+01-.4501357+01 .1515350+02-.7800496+01   1  47
-.4501476+01 .1739546+02-.7800513+01-.4501489+01 .1975867+02 .6551080+01   1  48
 .1300000+02 .3263619-00 .3333197+01-.2941502+01-.1197476+01 .1809718+01   1  49
-.1312341+01-.2779165+01 .2297929-00 .2964783-00-.4348113+01-.1330730+01   1  50
 .1908242+01-.5830171+01-.2777254+01 .3520393+01-.6994638+01-.3846726+01   1  51
 .5130741+01-.7595149+01-.4344290+01 .6824706+01-.7762473+01-.4472907+01   1  52
 .8596698+01-.7794566+01-.4496996+01 .1046851+02-.7799739+01-.4500861+01   1  53
 .1250873+02-.7800423+01-.4501371+01 .1464879+02-.7800505+01-.4501432+01   1  54
 .1689075+02-.7800514+01-.4501439+01 .1925396+02 .6907755+01 .1300000+02   1  55
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-.3481188+01-.7271568-01-.2384231-00-.5027200+01-.1617680+01 .1373259+01   1  57
-.6407469+01-.2993977+01 .2985387+01-.7326094+01-.3904645+01 .4595730+01   1  58
-.7694618+01-.4267308+01 .6289694+01-.7781694+01-.4352661+01 .8061686+01   1  59
-.7797595+01-.4368231+01 .9933494+01-.7800134+01-.4370717+01 .1197372+02   1  60
-.7800469+01-.4371045+01 .1411378+02-.7800509+01-.4371084+01 .1635574+02   1  61
-.7800513+01-.4371088+01 .1871895+02 .7313220+01 .1300000+02-.1157865+01   1  62
 .2133816+01-.4082580+01-.2696964+01 .5932061-00-.2455188+01-.4271959+01   1  63
-.9774310-00-.6465657-00-.5761323+01-.2456583+01 .7658730-00-.6947648+01   1  64
-.3613404+01 .2377554+01-.7561068+01-.4192540+01 .3987533+01-.7752075+01   1  65
-.4307391+01 .5681497+01-.7792110+01-.4403795+01 .7453498+01-.7799217+01   1  66
-.4410244+01 .9325290+01-.7800346+01-.4411268+01 .1136552+02-.7800495+01   1  67
-.4411403+01 .1350558+02-.7800512+01-.4411419+01 .1574754+02-.7800514+01   1  68
-.4411421+01 .1811075+02 .7000902+01 .1000000+02-.2380474+01 .1027813+01   1  22
-.3817020+01-.3357490+01 .5014431-01-.2770413+01-.3650442+01-.2499112-00   1  23
-.2487032+01-.4051871+01-.6431775-00-.2082644+01-.4724095+01-.1314924+01   1  24
-.1391603+01 .5459400+01-.2049157+01-.5894966-00-.6149161+01-.2736881+01   1  25
 .2121785-00-.6631307+01-.3216493+01 .8582077-00-.7447748+01-.4024612+01   1  26
 .2516571+01-.7750048+01-.432813 +01.4760271 +01 .7718685+01 .13     +02
-.192545 +01 .1445146+01-.4667028+01-.3496158+01-.1251106   -.3063293+01
-.5044348+01-.1671184+01-.145472 +01-.6420971+01-.3039836+01 .1576929
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-.7778715+01-.4367255+01 .5073299+01-.7796773+01-.438458 +01 .6845291+01
-.7799937+01-.4387615+01 .8717099+01-.7800439+01-.4388096+01 .1075732+02
-.7800505+01-.4388159+01 .1289739+02-.7800513+01-.4388166+01 .1513935+02
-.7800514+01-.4388167+01 .1750256+02 .7824046+01 .1      +02-.2819758+01
 .5205092   -.4152466+01-.3794436+01-.4534123   -.3133091+01-.4093477+01
-.7520297   -.2821718+01-.4482227+01-.114      +01-.2415127+01-.5143603+01
-.1799136+01-.1726302+01-.5852302+01-.2503016+01-.9242025   -.6492848+01
-.3135128+01-.1225313   -.691662 +01-.3549538+01 .5234968   -.7551325+01
-.4170124+01 .7181857+01-.7772345+01-.4369367+01 .4425556+01
         38
DIANE/SCAT  LIMESTONE-18  5-25-67  TEMP(50-1.E4)  AK/RW INPUT TAPE(3971)
 .1000000+01 .6150000+03
  1131.      .1500000+02
 .3912023+01 .1300000+02 .8675739+01 .9610432+01 .4085977-00 .8105946+01   1   1
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.6880718+01	.2095978+01	.7312465+01	.7921584+01	.3785015+01	.6054209+01	1	2
.6534984+01	.5446625+01	.4513311+01	.5005622+01	.7100656+01	.2988857+01	1	3
.3618555+01	.0748771+01	.1437620+01	.2135081+01	.1048225+02	-.7073347-01	1	4
.7047927-00	.1230788+02	-.1154282+01	-.6237974-00	.1423141+02	-.1595596+01	1	5
-.1421314+01	.1632690+02	-.1679594+01	-.1638634+01	.1850871+02	-.1678021+01	1	6
-.1657261+01	.2077446+02	-.1605436+01	-.1646921+01	.2315317+02	.4248495+01	1	7
.1300000+02	.6693770+01	.9393347+01	-.1733738-01	.7887182+01	.8622951+01	1	8
.1870899+01	.6809408+01	.7477360+01	.3351961+01	.5412983+01	.6107136+01	1	9
.5021457+01	.4048195+01	.4013194+01	.6694787+01	.2613557+01	.3481740+01	1	10
.8367464+01	.1068491+01	.2091298+01	.1011814+02	-.3649802-00	.5733847-00	1	11
.1193473+02	-.1264002+01	-.7512494-00	.1384251+02	-.1583436+01	-.1465864+01	1	12
.1590113+02	-.1644906+01	-.1617063+01	.1804872+02	-.1654964+01	-.1637278+01	1	13
.2029289+02	-.1654210+01	-.1636103+01	.2265962+02	.4605170+01	.1300000+02	1	14
.6549745+01	.9171733+01	-.4638297-00	.7693381+01	.8390482+01	.1223806+01	1	15
.6485951+01	.7213231+01	.2921494+01	.4979644+01	.5780037+01	.4615015+01	1	16
.3578981+01	.4499040+01	.6293869+01	.2077455+01	.3105132+01	.7951391+01	1	17
.4739419-00	.1566113+01	.9673228+01	-.8293367-00	-.7304373-01	.1145878+02	1	18
-.1421709+01	-.1179559+01	.1333036+02	-.1587674+01	-.1557931+01	.1538090+02	1	19
-.1635843+01	-.1621662+01	.1752464+02	-.1645210+01	-.1627620+01	.1976915+02	1	20
-.1648363+01	-.1628086+01	.2213278+02	.5010635+01	.1300000+02	.8075697+01	1	21
.8706250+01	-.9595196-00	.7114554+01	.7730998+01	.7450793-00	.5907481+01	1	22
.6510128+01	.2442748+01	.4579572+01	.5281151+01	.4118560+01	.2689122+01	1	23
.3766616+01	.5763295+01	.1271412+01	.2146038+01	.7388102+01	-.1682896-00	1	24
.5505511-00	.9069009+01	-.1083307+01	-.7824806-00	.1086512+02	-.1471228+01	1	25
-.1442730+01	.1273873+02	-.1614013+01	-.1602233+01	.1477933+02	-.1641765+01	1	26
-.1625071+01	.1691945+02	-.1645996+01	-.1627616+01	.1916142+02	-.1646457+01	1	27
-.1626096+01	.2152463+02	.5416100+01	.1300000+02	.7099274+01	.8082603+01	1	28
-.1455217+01	.8360391+01	.6910717+01	.2394144-00	.5267021+01	.5642912+01	1	29
.1909158+01	.3792983+01	.4186472+01	.3552572+01	.2158931+01	.2599143+01	1	30
.5177024+01	.6346964-00	.1042625+01	.6791646+01	-.6100469-00	-.3965872-00	1	31
.6486859+01	-.1321650+01	-.1287241+01	.1025912+02	-.1579958+01	-.1568377+01	1	32
.1213102+02	-.1636711+01	-.1619658+01	.1417161+02	-.1642377+01	-.1624030+01	1	33
.1631426+02	-.1634090+01	-.1615647+01	.1856552+02	-.1622558+01	-.1604148+01	1	34
.2094039+02	.5628948+01	.1300000+02	.5610553+01	.7208937+01	-.1995222+01	1	35
.5070647+01	.6021592+01	-.3232599-00	.4016769+01	.4645857+01	.1319231+01	1	36
.2593735+01	.3048582+01	.2946228+01	.1099095+01	.1446612+01	.4562698+01	1	37
-.2452261-00	.6070865-01	.6174301+01	-.1165114+01	-.9979864-00	.7870635+01	1	38
-.1527765+01	-.1447304+01	.9649748+01	-.1606402+01	-.1563173+01	.1153236+02	1	39
-.1614317+01	-.1590065+01	.1350095+02	-.1614543+01	-.1595779+01	.1572324+02	1	40
-.1614744+01	-.1598428+01	.1744556+02	-.1614802+01	-.1596490+01	.2032881+02	1	41
.8214608+01	.1300000+02	.4777401+01	.6264780+01	-.2526591+01	.3888042+01	1	42
.5065875+01	-.6745679-00	.2577773+01	.3575127+01	.7533653-00	.1137940+01	1	43
.2141952+01	.2373701+01	-.1267479-00	.9116683-00	.3994013+01	-.9749202-00	1	44
-.1347865-00	.5614561+01	-.1421735+01	-.1016144+01	.7316951+01	-.1565253+01	1	45
-.1460591+01	.9092212+01	-.1598690+01	-.1574805+01	.1096472+02	-.1611684+01	1	46
-.1594290+01	.1300506+02	-.1614561+01	-.1596286+01	.1514514+02	-.1614750+01	1	47
-.1596436+01	.1738711+02	-.1614704+01	-.1596449+01	.1975032+02	.6551080+01	1	48
.1300000+02	.4393973+01	.5685308+01	-.3000773+01	.3281121+01	.4431100+01	1	49
-.1368186+01	.1680598+01	.3152575+01	.2612964-00	.4418119-00	.1920910+01	1	50
.1868824+01	-.6289792-00	.6103329-00	.3507778+01	-.1210063+01	-.5958487-00	1	51
.5121328+01	-.1459080+01	-.1321215+01	.6816142+01	-.1571091+01	-.1551202+01	1	52
.8588305+01	-.1609350+01	-.1591355+01	.1046014+02	-.1613577+01	-.1595590+01	1	53
.1250037+02	-.1613967+01	-.1596043+01	.1464044+02	-.1614003+01	-.1596091+01	1	54
.1688240+02	-.1614007+01	-.1596096+01	.1924561+02	.6907755+01	.1300000+02	1	55
.4003619+01	.5020353+01	-.3513272+01	.2878964+01	.3870614+01	-.1884519+01	1	56

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 .1442767+01 .2594667+01-.2568313-00 .4739788-01 .1160399+01 .1363524+01   1  57
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-.1563150+01-.1525692+01 .6281334+01-.1607305+01-.1586443+01 .8053328+01   1  59
-.1612227+01-.1594165+01 .9925137+01-.1612847+01-.1595257+01 .1196536+02   1  60
-.1612928+01-.1595401+01 .1410543+02-.1612938+01-.1595418+01 .1634739+02   1  61
-.1612939+01-.1595420+01 .1071060+02 .7313220+01 .1300000+02 .3068661+01   1  62
 .4325955+01-.4104624+01 .2065682+01 .3037716+01-.2477642+01 .6609440-00   1  63
 .1557523+01-.8573222-00-.6227073-00 .1064714+00 .7575462-00-.1330123+01   1  64
-.1010882+01 .2369293+01-.1554813+01-.1482311+01 .3979266+01-.1604882+01   1  65
-.1577101+01 .5673156+01-.1611814+01-.1592292+01 .7445134+01-.1612966+01   1  66
-.1594836+01 .9316940+01-.1613151+01-.1595238+01 .1135716+02-.1613175+01   1  67
-.1595292+01 .1349723+02-.1613178+01-.1595298+01 .1573910+02-.1613178+01   1  68
-.1595299+01 .1810240+02 .7718065+01 .1300000+02 .1435811+01 .3481097+01   1  69
-.4700577+01 .2654173-00 .2047148+01-.3080228+01-.7686510-00 .5491915-00   1  70
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 .1761186+01-.1610176+01-.1566725+01 .3371087+01-.1619959+01-.1598685+01   1  72
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-.1633319+01-.1621094+01 .1012970+02-.1633321+01-.1621102+01 .1226976+02   1  81
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 .1666628+01-.1655694+01-.1670763+01 .3362494+01-.1655732+01-.1670851+01   1  93
 .5134467+01-.1655738+01-.1670866+01 .7006273+01-.1655738+01-.1670868+01   1  94
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 .1342852+02-.1655739+01-.1670869+01 .1579173+02 .9210340+01 .1300000+02   1  96
-.1466661+01-.3085461-00-.6922303+01-.1599281+01-.1283321+01-.5307561+01   1  97
-.1640667+01-.1606685+01-.3676960+01-.1652282+01-.1661370+01-.2086389+01   1  98
-.1655047+01-.1669259+01-.4762413-00-.1655634+01-.1670589+01 .1133616+01   1  99
-.1655719+01-.1670817+01 .2827482+01-.1655735+01-.1670860+01 .4599455+01   1 100
-.1655738+01-.1670867+01 .6471260+01-.1655739+01-.1670869+01 .8511481+01   1 101
-.1655739+01-.1670869+01 .1065155+02-.1655739+01-.1670869+01 .1289351+02   1 102
-.1655739+01-.1670869+01 .1525672+02 .0000000    .0000000    .0000000      1 103
        53
DIANE/SCAT  NE-1A  TEMP(1.5-1.E4)  11-6-67  SAUY INPUT TAPES(3956,3963)
 .1000000+01 .9840000+03
     1010.   .2400000+02
 .4054651-00 .1300000+02 .3509196+01 .1008005+02-.3783041+01 .3471987+01   1   1
 .9794615+01-.1385241+01 .3468540+01 .9437083+01 .1364030+01 .3449899+01   1   2
 .8334518+01 .4314791+01 .3388121+01 .7223265+01 .7358307+01 .3193403+01   1   3
 .6346392+01 .1034880+02 .2557088+01 .5388150+01 .1311818+02 .1190349+01   1   4
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 .3970299+01 .1536146+02-.6092082-00 .2139229+01 .1734564+02-.2344850+01   1   5
 .1021474+00 .1940517+02-.3452796+01-.1910473+01 .2154921+02-.3825573+01   1   6
-.3379644+01 .2380469+02-.3779386+01-.3647996+01 .2628298+02 .8109302-00   1   7
 .1300000+02 .6945509+01 .1222961+02-.6876729-02 .6947318+01 .1199086+02   1   8
 .2487041+01 .6762675+01 .1164342+02 .5147451+01 .6207716+01 .1036075+02   1   9
 .7616481+01 .5079655+01 .8495145+01 .9649177+01 .3595483+01 .6586633+01   1  10
 .1138644+02 .2015636+01 .4766942+01 .1311536+02 .7511151-00 .3066513+01   1  11
 .1492323+02-.3210947-00 .1550232+01 .1694174+02-.1454838+01 .1686794-00   1  12
 .1930475+02-.2580930+01-.1552960+01 .2160362+02-.3119184+01-.2627279+01   1  13
 .2387260+02-.3208141+01-.3157144+01 .2625014+02 .1223775+01 .1300000+02   1  14
 .9534134+01 .1283570+02 .1790199+01 .8935943+01 .1220352+02 .3679682+01   1  15
 .8148288+01 .1129001+02 .5027299+01 .7121502+01 .9682005+01 .7577958+01   1  16
 .6057307+01 .6085351+01 .9305496+01 .5020792+01 .6737324+01 .1114097+02   1  17
 .3618451+01 .5260672+01 .1307381+02 .1773936+01 .3524904+01 .1494307+02   1  18
 .5170245-01 .1672990+01 .1685997+02-.1357694+01-.1045013+00 .1902759+02   1  19
-.2342778+01-.1630014+01 .2135368+02-.2738518+01-.2573140+01 .2365454+02   1  20
-.2600385+01-.2765779+01 .2604006+02 .1609438+01 .1300000+02 .1124312+02   1  21
 .1205103+02 .1939778+01 .1053754+02 .1217430+02 .3750118+01 .9455988+01   1  22
 .1145976+02 .5607440+01 .7957891+01 .9996557+01 .7474419+01 .6262373+01   1  23
 .6267379+01 .9257103+01 .4779185+01 .6606038+01 .1096981+02 .3502120+01   1  24
 .5112191+01 .1281469+02 .2037961+01 .3511820+01 .1473259+02 .3673397-00   1  25
 .1653893+01 .1666983+02-.1189084+01-.1225017+00 .1880328+02-.2133084+01   1  26
-.1556748+01 .2107965+02-.2451100+01-.2332654+01 .2337538+02-.2446392+01   1  27
-.2418186+01 .2581386+02 .1945910+01 .1300000+02 .1206599+02 .1256729+02   1  28
 .1865336+01 .1090848+02 .1219764+02 .3683805+01 .9411291+01 .1135856+02   1  29
 .5475748+01 .7960069+01 .9916333+01 .7267267+01 .6550690+01 .8341749+01   1  30
 .9060431+01 .5070514+01 .6693267+01 .1079767+02 .3596442+01 .5014780+01   1  31
 .1259565+02 .2080595+01 .3401100+01 .1449631+02 .4357301-00 .1646202+01   1  32
 .1645245+02-.1090748+01-.79[illegible]-01 .1859128+02-.1961161+01-.1560146+01   1  33
 .2082933+02-.2198676+01-.2129746+01 .2313738+02-.2157405+01-.2134409+01   1  34
 .2560102+02 .2302585+01 .1300000+02 .1192066+02 .1238920+02 .1703687+01   1  35
 .1097220+02 .1197204+02 .3477480+01 .9621047+01 .1126823+02 .5259408+01   1  36
 .8121883+01 .9804320+01 .7050742+01 .6628993+01 .8206484+01 .8819183+01   1  37
 .5252689+01 .6583501+01 .1055480+02 .3673767+01 .4943723+01 .1235972+02   1  38
 .2059323+01 .3263079+01 .1423419+02 .4191138-00 .1508998+01 .1620215+02   1  39
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-.1931637+01-.1800100+01 .2288601+02-.1902154+01-.1880829+01 .2532376+02   1  41
 .2700050+01 .1300000+02 .1154662+02 .1207397+02 .1434319+01 .1084905+02   1  42
 .1164296+02 .3212077+01 .9605786+01 .1081812+02 .4994704+01 .8109213+01   1  43
 .9339033+01 .6765598+01 .6617472+01 .7763711+01 .8527066+01 .5128184+01   1  44
 .6185382+01 .1025785+02 .3612790+01 .4606281+01 .1205938+02 .1895637+01   1  45
 .2983826+01 .1392861+02 .1728474-00 .1265432+01 .1588496+02-.1157761+01   1  46
-.4189447-00 .1800025+02-.1704918+01-.1513633+01 .2016864+02-.1626965+01   1  47
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 .1300000+02 .1075528+02 .1156157+02 .1159383+01 .1041710+02 .1122079+02   1  49
 .2915057+01 .9453594+01 .1041677+02 .4695267+01 .8045428+01 .8938454+01   1  50
 .6951512+01 .6561695+01 .7327937+01 .8198958+01 .4905675+01 .5701143+01   1  51
 .9914869+01 .3049874+01 .4058491+01 .1168979+02 .1124346+01 .2222513+01   1  52
 .1350140+02-.5595650-00 .3712281-00 .1538307+02-.1510027+01-.1129311+01   1  53
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 .2180727+02-.1844033+01-.1826772+01 .2417048+02 .3526360+01 .1300000+02   1  55
 .9700133+01 .1097746+02 .8034166-00 .9522104+01 .1058174+02 .2549041+01   1  56
 .8928445+01 .9537628+01 .4323031+01 .7582137+01 .8012245+01 .6062694+01   1  57
 .5731730+01 .6357613+01 .7765798+01 .3782448+01 .4623473+01 .9414549+01   1  58
 .1826666+01 .2836793+01 .1111925+02 .8867510-01 .1040924+01 .1289347+02   1  59
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-.1091265+01	-.5915076-00	.1476568+02	-.1625054+01	-.1557927+01	.1680597+02	1	60
-.1802905+01	-.1792435+01	.1094604+02	-.1841091+01	-.1824132+01	.2118801+02	1	61
-.1845713+01	-.1027552+01	.2355123+02	.3912023+01	.1300000+02	.8403888+01	1	62
.1035146+02	.4315471-00	.8205724+01	.4826730+01	.2162461+01	.7470890+01	1	63
.6566604+01	.3900738+01	.6191956+01	.6878801+01	.5582059+01	.4535295+01	1	64
.5131669+01	.7226085+01	.2760726+01	.3419310+01	.8846562+01	.1004981+01	1	65
.1692449+01	.1054290+02	-.4652459-00	.1556838-01	.1231538+02	-.1380525+01	1	66
-.1244369+01	.1418738+02	-.1754841+01	-.1727784+01	.1622851+02	-.1826050+01	1	67
-.1695167+01	.1037572+02	-.1795750+01	-.1775917+01	.2065647+02	-.1735504+01	1	68
-.1716830+01	.2308332+02	.4246495+01	.1300000+02	.7358771+01	.9584414+01	1	69
.6147072-01	.6801025+01	.8842797+01	.1763008+01	.5825688+01	.7544659+01	1	70
.3455035+01	.4488719+01	.5940538+01	.5101621+01	.2965413+01	.4130878+01	1	71
.6727065+01	.1441414+01	.2417593+01	.8343762+01	.1205101-01	.7828608-00	1	72
.1004169+02	-.1020371+01	-.5085568-00	.1182742+02	-.1538906+01	-.1226558+01	1	73
.1374520+02	-.1677691+01	-.1544696+01	.1564489+02	-.1657349+01	-.1606370+01	1	74
.1804487+02	-.1628778+01	-.1605662+01	.2032146+02	-.1623745+01	-.1604915+01	1	75
.2269051+02	.4605170+01	.1300000+02	.6512639+01	.8669656+01	-.3784718-00	1	76
.5586735+01	.7080273+01	.1287151+01	.4460772+01	.6272324+01	.2942952+01	1	77
.3039505+01	.4738273+01	.4578172+01	.1708234+01	.3458182+01	.6212667+01	1	78
.5603825-00	.2450340+01	.7867655+01	-.3998702-00	.1315948+01	.9620762+01	1	79
-.1134294+01	.9222192-01	.1145064+02	-.1500514+01	-.9843932-00	.1335947+02	1	80
-.1602970+01	-.1494182+01	.1540931+02	-.1619043+01	-.1591189+01	.1755078+02	1	81
-.1621596+01	-.1603463+01	.1979291+02	-.1623029+01	-.1604740+01	.2215614+02	1	82
.5010635+01	.1300000+02	.6541936+01	.8314122+01	-.9320016-00	.5355249+01	1	83
.7310620+01	.7260391-00	.4081105+01	.6126346+01	.2393574+01	.2803290+01	1	84
.4991397+01	.4070263+01	.1491705+01	.3775158+01	.5747148+01	.1646782-00	1	85
.2423579+01	.7402473+01	-.8327777-00	.6896498-00	.9113836+01	-.1358760+01	1	86
-.5229320-00	.1080982+02	-.1535748+01	-.1359010+01	.1276235+02	-.1593953+01	1	87
-.1574028+01	.1480269+02	-.1619682+01	-.1602549+01	.1694277+02	-.1622345+01	1	88
-.1604403+01	.1916474+02	-.1622404+01	-.1604524+01	.2154795+02	.5416100+01	1	89
.1300000+02	.6732098+01	.8180223+01	-.1479233+01	.5643504+01	.7154653+01	1	90
.2083193-00	.4317666+01	.5681898+01	.1900093+01	.2709182+01	.4456059+01	1	91
.3567054+01	.9970639-00	.2896832+01	.5199951+01	-.3109239-00	.1348124+01	1	92
.6815177+01	-.1021264+01	-.1331048-00	.8510235+01	-.1369064+01	-.1178421+01	1	93
.1028244+02	-.1572006+01	-.1547793+01	.1215428+02	-.1615302+01	-.1598091+01	1	94
.1419451+02	-.1618674+01	-.1602104+01	.1633458+02	-.1618927+01	-.1602470+01	1	95
.1857654+02	-.1618954+01	-.1602510+01	.2093975+02	.5028946+01	.1300000+02	1	96
.6407169+01	.7620240+01	-.2088536+01	.5484418+01	.6538342+01	-.3204607-00	1	97
.4064808+01	.4975877+01	.1339534+01	.2324453+01	.3358284+01	.2969708+01	1	98
.7163714-00	.1754838+01	.4586099+01	-.4954278-00	.2561196-00	.6147082+01	1	99
-.1265445+01	-.9737118-00	[illegible]	[illegible]	-.1503413+01	[illegible]	1	100
-.1610018+01	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	101
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	102
[illegible]	[illegible]	[illegible]	[illegible]	.1300000+02	[illegible]	1	103
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	104
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	105
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	106
-.1425099+01	.7312723+01	-.1610578+01	-.1580047+01	.9084719+01	-.1619254+01	1	107
-.1601166+01	.1095653+02	-.1620543+01	-.1604277+01	.1299675+02	-.1620716+01	1	108
-.1604688+01	.1513682+02	-.1620737+01	-.1604737+01	.1737878+02	-.1620739+01	1	109
-.1604743+01	.1974199+02	.6551030+01	.1300000+02	.3546209+01	.5857937+01	1	110
-.3000202+01	.2322830+01	.4446090+01	-.1343534+01	.8340885-00	.2848333+01	1	111
.2724284-00	-.4360236-00	.1306247+01	.1890302+01	-.1203933+01	-.1612318-00	1	112
.3503773+01	-.1514660+01	-.1194303+01	.5114064+01	-.1606684+01	-.1543616+01	1	113
.6808022+01	-.1625207+01	-.1603964+01	.8580012+01	-.1628591+01	-.1613811+01	1	114

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 .1045182+02-.1629028+01-.1615207+01 .1249204+02-.1629086+01-.1615391+01   1 115
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 .1923728+02 .6907755+01 .1300000+02 .2027853+01 .4851585+01-.3511190+01   1 117
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-.1670743+01 .7436803+01-.1655763+01-.1671023+01 .9308610+01-.1655780+01   1 128
-.1671067+01 .1134883+02-.1655782+01-.1671073+01 .1348890+02-.1655782+01   1 129
-.1671074+01 .1573086+02-.1655782+01-.1671074+01 .1809407+02 .7718685+01   1 130
 .1300000+02-.4728055-00 .2271574+01-.4698209+01-.1204926+01 .7802448-00   1 131
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 .1415086-00-.1645127+01-.1631299+01 .1752524+01-.1653464+01-.1665072+01   1 133
 .3362690+01-.1655474+01-.1670212+01 .5056620+01-.1655726+01-.1670927+01   1 134
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 .1512266+02-.1655782+01-.1671074+01 .1748587+02 .8131531+01 .1300000+02   1 137
-.9192870-00 .1496234+01-.5315536+01-.1402691+01 .2858587-01-.3704384+01   1 138
-.1579398+01-.1111572+01-.2090280+01-.1634927+01-.1569696+01-.4777004-00   1 139
-.1650829+01-.1656328+01 .1133272+01-.1654715+01-.1668612+01 .2743426+01   1 140
-.1655641+01-.1670696+01 .4437353+01-.1655758+01-.1671010+01 .6209338+01   1 141
-.1655779+01-.1671064+01 .8081145+01-.1655782+01-.1671072+01 .1012137+02   1 142
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-.1671074+01 .1168294+02-.1655782+01-.1671074+01 .1392490+02-.1655782+01   1 150
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-.6397174+01-.1568963+01-.1025219+01-.4779620+01-.1631763+01-.1548287+01   1 152
-.3169990+01-.1650157+01-.1653376+01-.1359613+01-.1654516+01-.1668142+01   1 153
 .5008435-01-.1655604+01-.1670593+01 .1660227+01-.1655748+01-.1670985+01   1 154
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 .6997943+01-.1655782+01-.1671073+01 .9038164+01-.1655782+01-.1671074+01   1 156
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-.1606125+01-.1342052+01-.5314530+01-.1642947+01-.1618971+01-.3704965+01   1 159
-.1652986+01-.1663427+01-.2094614+01-.1655261+01-.1669803+01-.4849246-00   1 160
-.1655693+01-.1670640+01 .1125216+01-.1655766+01-.1671031+01 .2819139+01   1 161
-.1655780+01-.1671066+01 .4591123+01-.1655782+01-.1671073+01 .6462930+01   1 162
-.1655782+01-.1671074+01 .8503152+01-.1655782+01-.1671074+01 .1064322+02   1 163
-.1655782+01-.1671074+01 .1288518+02-.1655782+01-.1671074+01 .1524839+02   1 164
          57
DIANE/SCAT PHENOLIC-1A TEMP(.861667-34.)EV. SADY INPUT TAPE 1250 11-8-67
 .1000000+01 .4510000+03
   1107.    .1100000+02                                                    1   0
-.1488864-00 .1300000+02 .7396268+01 .1205435+02-.2876988+01 .7323616+01   1   1
```

.1155767+02	-.7492269-00	.7093312+01	.1135086+02	.1642010+01	.6626596+01	1	2
.1062392+02	.4703754+01	.6116535+01	.9390664+01	.7713694+01	.5610584+01	1	3
.8208264+01	.1076118+02	.4930217+01	.7194506+01	.1379163+02	.3784311+01	1	4
.5911545+01	.1644249+02	.2236693+01	.4335992+01	.1884014+02	.3653600-00	1	5
.2468522+01	.2117293+02	-.1454546+01	.3731602-00	.2337724+02	-.2557072+01	1	6
-.1603718+01	.2562787+02	-.2659038+01	-.2674482+01	.2799498+02	.0000000	1	7
.1300000+02	.8704367+01	.1269055+02	-.1509683+01	.8575912+01	.1225481+02	1	8
.6965901-00	.6271030+01	.1207806+02	.3330837+01	.7823217+01	.1135297+02	1	9
.6204004+01	.7315407+01	.1017098+02	.9162954+01	.6596711+01	.8047084+01	1	10
.1198253+02	.5402552+01	.7543123+01	.1451814+02	.3845427+01	.5983863+01	1	11
.1680257+02	.2017667+01	.4199766+01	.1891721+02	-.6943911-02	.2138439+01	1	12
.2101423+02	-.1758783+01	.1737945-02	.2316385+02	-.2619865+01	-.1831214+01	1	13
.2542023+02	-.2726942+01	-.2575849+01	.2788385+02	.4054651-00	.1300000+02	1	14
.1163704+02	.1371671+02	.1126432+01	.1128572+02	.1337897+02	.3486783+01	1	15
.1072433+02	.1315606+02	.6101769+01	.9904459+01	.1226202+02	.8673415+01	1	16
.8573031+01	.1069237+02	.1094918+02	.6885636+01	.8904814+01	.1289567+02	1	17
.5026619+01	.7013293+01	.1470350+02	.3226430+01	.5099725+01	.1651134+02	1	18
.1682039+01	.3295718+01	.1844663+02	.2084309-00	.1634667+01	.2065812+02	1	19
-.1354571+01	-.2090645-00	.2291311+02	-.2218547+01	-.1781306+01	.2520000+02	1	20
-.2436744+01	-.2369984+01	.2759390+02	.8109302-00	.1300000+02	.1328778+02	1	21
.1396296+02	.2527477+01	.1280136+02	.1352724+02	.4804134+01	.1186231+02	1	22
.1295880+02	.7046187+01	.1046484+02	.1162760+02	.9039274+01	.8773395+01	1	23
.9892006+01	.1080272+02	.7184165+01	.6291926+01	.1251469+02	.5606551+01	1	24
.6791198+01	.1436318+02	.3768977+01	.5071801+01	.1625668+02	.1829731+01	1	25
.3197410+01	.1818522+02	-.8270833-01	.1133056+01	.2026462+02	-.1461490+01	1	26
-.6028539-00	.2250613+02	-.2015388+01	-.1765606+01	.2486049+02	-.2163706+01	1	27
-.2120254+01	.2727074+02	.1223775+01	.1300000+02	.1345512+02	.1373888+02	1	28
.2993424+01	.1295045+02	.1320510+02	.4998948+01	.1197320+02	.1267814+02	1	29
.6900149+01	.1050115+02	.1153356+02	.8733734+01	.8731493+01	.9872228+01	1	30
.1051292+02	.6934690+01	.8120531+01	.1222504+02	.5250453+01	.6446079+01	1	31
.1400280+02	.3623132+01	.4788558+01	.1589147+02	.1741265+01	.2916272+01	1	32
.1704045+02	-.9482201-01	.9749307-00	.1995614+02	-.1356919+01	-.6841614-00	1	33
.2219898+02	-.1839542+01	-.1685303+01	.2450072+02	-.1940440+01	-.1409904+01	1	34
.2689062+02	.1609430+01	.1300000+02	.1289070+02	.1338732+02	.2964364+01	1	35
.1261917+02	.1296917+02	.4801739+01	.1170927+02	.1241925+02	.6643582+01	1	36
.1027161+02	.1122656+02	.8429064+01	.8615642+01	.9641904+01	.1017915+02	1	37
.6859420+01	.7946944+01	.1190588+02	.5130827+01	.6120881+01	.1369097+02	1	38
.3352906+01	.4341944+01	.1556108+02	.1391538+01	.2515868+01	.1750132+02	1	39
-.4580784-00	.5535904-00	.1957110+02	-.1543642+01	-.1104248+01	.2172166+02	1	40
-.1860674+01	-.1783105+01	.2397975+02	-.1903500+01	-.1884774+01	.2635641+02	1	41
.1945910+01	.1300000+02	.1216413+02	.1301721+02	.2772799+01	.1204618+02	1	42
.1261226+02	.4568831+01	.1139679+02	.1204261+02	.6370166+01	.1003228+02	1	43
.1078240+02	.8137078+01	.8339901+01	.9119571+01	.9079928+01	.6619211+01	1	44
.7365098+01	.1159674+02	.4638641+01	.5550115+01	.1335994+02	.2613813+01	1	45
.3648925+01	.1516032+02	.7813608-00	.1764193+01	.1705059+02	-.8429071-00	1	46
-.1295443-00	.1910661+02	-.1642340+01	-.1432511+01	.2126146+02	-.1828045+01	1	47
-.1806517+01	.2351841+02	-.1875734+01	-.1858773+01	.2488524+02	.2302585+01	1	48
.1300000+02	.1124672+02	.1250506+02	.2501238+01	.1119344+02	.1213170+02	1	49
.4285118+01	.1076024+02	.1143384+02	.6037999+01	.9615188+01	.1008636+02	1	50
.7786876+01	.7843430+01	.8341706+01	.9501743+01	.5831803+01	.6481209+01	1	51
.1116069+02	.3881518+01	.4636573+01	.1288049+02	.1960238+01	.2804159+01	1	52
.1467017+02	.1036813+00	.9730338-00	.1655775+02	-.1183488+01	-.7428909-00	1	53
.1860423+02	-.1719754+01	-.1648158+01	.2074534+02	-.1858228+01	-.1839512+01	1	54
.2298743+02	-.1879095+01	-.1861891+01	.2535065+02	.2708050+01	.1300000+02	1	55
.1004861+02	.1177993+02	.2126617+01	.9925491+01	.1129418+02	.3872772+01	1	56

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 .9578609+01 .1046693+02 .5606765+01 .8635299+01 .5946784+01 .7300424+01   1  57
 .6943763+01 .7178323+01 .8962177+01 .5036142+01 .5377825+01 .1060140+02   1  58
 .3023019+01 .3519554+01 .1230864+02 .1086245+01 .1680600+01 .1408434+02   1  59
-.5481989-00-.6026237-01 .1595688+02-.1501770+01-.1377496+01 .1799735+02   1  60
-.1800121+01-.1792502+01 .2013850+02-.1862021+01-.1844631+01 .2238997+02   1  61
-.1813957+01-.1795276+01 .2480786+02 .3113515+01 .1300000+02 .8436216+01   1  62
 .1094286+02 .1664106+01 .6597530+01 .1035594+02 .3392075+01 .8064288+01   1  63
 .9296397+01 .5080062+01 .7096707+01 .7705021+01 .6743330+01 .5490681+01   1  64
 .5912249+01 .6384907+01 .3695548+01 .4142503+01 .1000800+02 .1925984+01   1  65
 .2409943+01 .1170731+02 .3361317-00 .6551778-00 .1349273+02-.8910610-00   1  66
-.2956566-00 .1541381+02-.1537603+01-.1216115+01 .1751915+02-.1685967+01   1  67
-.1607668+01 .1969364+02-.1650694+01-.1622730+01 .2199838+02-.1610127+01   1  68
-.1590681+01 .2440617+02 .3526360+01 .1300000+02 .8224901+01 .1013809+02   1  69
 .1150635+01 .7516756+01 .9275640+01 .2845973+01 .6571836+01 .8077291+01   1  70
 .4513468+01 .5251848+01 .6500299+01 .6158129+01 .3832690+01 .5165085+01   1  71
 .7805949+01 .2412270+01 .3996801+01 .9479251+01 .9427020-00 .2625664+01   1  72
 .1122950+02-.2930220-00 .1235899+01 .1305305+02-.1150707+01-.1075674+00   1  73
 .1498238+02-.1510261+01-.1196373+01 .1704674+02-.1580977+01-.1518749+01   1  74
 .1919020+02-.1579252+01-.1556674+01 .2145258+02-.1572700+01-.1554448+01   1  75
 .2382403+02 .0000000    .0000000    .0000000    .0000000    .0000000      1  76
          4
DIANE/SCAT OPLTCA     19 FREQ. TEMP.(1.-2250.) C1/RTW-AFWL 11-25-66
 .1900000+02 .8610000+03
     1124. .2100000E+02
 .0000000    .1300000+02 .6360457+01 .9675488+01-.2662175-00 .6704824+01   1   1
 .9509306+01 .1908690+01 .6627136+01 .9381302+01 .4465035+01 .6398674+01   1   2
 .9004290+01 .7080887+01 .5808522+01 .8221526+01 .9422521+01 .4918923+01   1   3
 .7171276+01 .1146267+02 .3812884+01 .6375975+01 .1363218+02 .2638152+01   1   4
 .4910197+01 .1600605+02 .1146469+01 .3156651+01 .1822594+02-.5676764-00   1   5
 .1324305+01 .2041762+02-.2197785+01-.6503493-00 .2262645+02-.3083742+01   1   6
-.2462769+01 .2488244+02-.3359159+01-.3266519+01 .2725677+02 .4054651-00   1   7
 .1300000+02 .9169859+01 .1115098+02 .1271949+01 .9009848+01 .1089895+02   1   8
 .3438773+01 .8750252+01 .1066935+02 .5747365+01 .8293466+01 .1011945+02   1   9
 .7990001+01 .7512050+01 .9091565+01 .1020165+02 .6408134+01 .7713306+01   1  10
 .1221367+02 .4950104+01 .6218449+01 .1410003+02 .3149996+01 .4375091+01   1  11
 .1595564+02 .1182044+01 .2440370+01 .1785606+02-.7267326-00 .4579919-00   1  12
 .1992705+02-.2205996+01-.1305733+01 .2214446+02-.2817475+01-.2418279+01   1  13
 .2459837+02-.2908652+01-.2850302+01 .2711243+02 .8109302-00 .1300000+02   1  14
 .1108015+02 .1183227+02 .2100390+01 .1070339+02 .1150010+02 .4228813+01   1  15
 .1015075+02 .1101625+02 .6417363+01 .9199053+01 .1001160+02 .8414305+01   1  16
 .7869553+01 .8682235+01 .1021136+02 .6359144+01 .7122866+01 .1190478+02   1  17
 .4837588+01 .5594554+01 .1367614+02 .3247645+01 .4174408+01 .1560791+02   1  18
 .1486339+01 .2576709+01 .1766607+02-.4239082-00 .6271632-00 .1978446+02   1  19
-.1936600+01-.1214802+01 .2198126+02-.2587600+01-.2374441+01 .2429720+02   1  20
-.2656174+01-.2622230+01 .2677291+02 .1223775+01 .1300000+02 .1166009+02   1  21
 .1181946+02 .2470291+01 .1115058+02 .1123898+02 .4429359+01 .1035431+02   1  22
 .1056289+02 .6308225+01 .9315664+01 .9796144+01 .8105480+01 .8019590+01   1  23
 .8679545+01 .9902027+01 .6528763+01 .7460829+01 .1169107+02 .4831070+01   1  24
 .5819934+01 .1349011+02 .3146230+01 .4029928+01 .1534806+02 .1363887+01   1  25
 .2256119+01 .1732919+02-.4804297-00 .3895829-00 .1947120+02-.1884308+01   1  26
-.1384660+01 .2165102+02-.2414228+01-.2305007+01 .2393038+02-.2442414+01   1  27
-.2419647+01 .2638598+02 .1609438+01 .1300000+02 .1144896+02 .1159322+02   1  28
 .2425932+01 .1090408+02 .1106034+02 .4217368+01 .1011773+02 .1047448+02   1  29
 .8065704+01 .9162441+01 .9796392+01 .7889378+01 .7871443+01 .8539757+01   1  30
 .9648406+01 .6327231+01 .7039031+01 .1138832+02 .4619551+01 .5388227+01   1  31
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.1319292+02	.2035289+01	.3610860+01	.1502736+02	.1012789+01	.1858067+01	1	32
.1690892+02	-.7813473-00	.3109066-01	.1908842+02	-.1911623+01	-.1539000+01	1	33
.2120658+02	-.2234633+01	-.2158209+01	.2358152+02	-.2257487+01	-.2238838+01	1	34
.2600176+02	.1945910+01	.1300000+02	.1120571+02	.1142562+02	.2250511+01	1	35
.1074449+02	.1091272+02	.4026848+01	.1011399+02	.1046003+02	.5839522+01	1	36
.9026634+01	.9603931+01	.7629974+01	.7484521+01	.8227806+01	.9382287+01	1	37
.5904989+01	.6671191+01	.1106490+02	.4231352+01	.5020578+01	.1286741+02	1	38
.2537497+01	.3331644+01	.1470505+02	.7093901-00	.1818186+01	.1664727+02	1	39
-.9963425-00	-.3992489-01	.1875398+02	-.1854492+01	-.1539936+01	.2096140+02	1	40
-.2054797+01	-.2000080+01	.2326322+02	-.2087782+01	-.2071191+01	.2567263+02	1	41
.2302585+01	.1300000+02	.1096449+02	.1126093+02	.1998267+01	.1055618+02	1	42
.1078976+02	.3756904+01	.9797658+01	.1026464+02	.5543566+01	.8605514+01	1	43
.9345711+01	.7313724+01	.7075869+01	.7898149+01	.9043327+01	.5522603+01	1	44
.6340360+01	.1074054+02	.3694732+01	.4715410+01	.1251739+02	.2175578+01	1	45
.3052687+01	.1437010+02	.3297190-00	.1314824+01	.1632080+02	-.1204147+01	1	46
-.4526322-00	.1639763+02	-.1662066+01	-.1648084+01	.2056308+02	-.2017423+01	1	47
-.1985183+01	.2282106+02	-.2921708+01	-.2008591+01	.2520522+02	.2708050+01	1	48
.1300000+02	.1053663+02	.1098938+02	.1683027+01	.1026196+02	.1058640+02	1	49
.3412516+01	.9559423+01	.1002127+02	.5173321+01	.8342313+01	.8938929+01	1	50
.6925874+01	.6853482+01	.7487343+01	.8654923+01	.5111097+01	.5871957+01	1	51
.1035484+02	.3269405+01	.4123377+01	.1210603+02	.1426944+01	.2305736+01	1	52
.1391204+02	-.2543089-00	.4920990-00	.1580710+02	-.1451290+01	-.1071640+01	1	53
.1786902+02	-.1660679+01	-.1600346+01	.2003282+02	-.1938527+01	-.1926138+01	1	54
.2229651+02	-.1934695+01	-.1920697+01	.2468715+02	.3113515+01	.1300000+02	1	55
.1017466+02	.1067771+02	.1302516+01	.9937166+01	.1032002+02	.3035277+01	1	56
.9227512+01	.9566973+01	.4702203+01	.7913439+01	.8376405+01	.6523700+01	1	57
.6103253+01	.6765163+01	.6211593+01	.4346719+01	.4977934+01	.9062666+01	1	58
.2627126+01	.3251422+01	.1158587+02	.7089234-00	.1513763+01	.1338516+02	1	59
-.7515476-00	-.1308645-00	.1526616+02	-.1557805+01	-.1347602+01	.1735745+02	1	60
-.1811741+01	-.1776238+01	.1952624+02	-.1845055+01	-.1828867+01	.2179805+02	1	61
-.1626051+01	-.1813430+01	.2418733+02	.3526360+01	.1300000+02	.9574938+01	1	62
.1022568+02	.6001268-00	.9234188+01	.9706997+01	.2611435+01	.8411781+01	1	63
.8735696+01	.4328922+01	.7020797+01	.7377035+01	.6025970+01	.5353279+01	1	64
.5802047+01	.7665672+01	.3622455+01	.4257660+01	.9333313+01	.1895372+01	1	65
.2736970+01	.1106185+02	.3121712-00	.1217026+01	.1286652+02	-.9996136-00	1	66
-.3780445-00	.1476925+02	-.1619450+01	-.1432241+01	.1683543+02	-.1753458+01	1	67
-.1710646+01	.1900859+02	-.1736920+01	-.1719540+01	.2129286+02	-.1712568+01	1	68
-.1698653+01	.2368367+02	.3912023+01	.1300000+02	.8877927+01	.9575676+01	1	69
.4246144-00	.8374272+01	.8023608+01	.2139793+01	.7644528+01	.7950531+01	1	70
.3836265+01	.6258613+01	.5670040+01	.5514652+01	.4661174+01	.5209595+01	1	71
.7168937+01	.2962130+01	.3711504+01	.6816376+01	.1308127+01	.2185795+01	1	72
.1055085+02	-.2276067-00	.7253857-00	.1237225+02	-.1236107+01	-.6308949-00	1	73
.1426631+02	-.1584648+01	-.1406490+01	.1637161+02	-.1643730+01	-.1610055+01	1	74
.1854315+02	-.1656357+01	-.1640877+01	.2079589+02	-.1654418+01	-.1640469+01	1	75
.2316414+02	.4246495+01	.1300000+02	.8560684+01	.9124735+01	.2374196-01	1	76
.8052980+01	.6429943+01	.1722735+01	.7161131+01	.7479452+01	.3412528+01	1	77
.5664609+01	.6211617+01	.5086929+01	.3962255+01	.4783117+01	.6758947+01	1	78
.2341923+01	.3387646+01	.8424123+01	.8028794-00	.1935083+01	.1016491+02	1	79
-.5563596-00	.4317234-00	.1197594+02	-.1329903+01	-.8756332-00	.1386592+02	1	80
-.1565914+01	-.1497203+01	.1591334+02	-.1639629+01	-.1620676+01	.1805586+02	1	81
-.1649557+01	-.1636698+01	.2029824+02	-.1652284+01	-.1638469+01	.2266150+02	1	82
.4605170+01	.1300000+02	.8331545+01	.8858250+01	-.4198661-00	.7765316+01	1	83
.8164065+01	.1274744+01	.6724069+01	.7102883+01	.2979119+01	.5116818+01	1	84
.5720115+01	.4668983+01	.3482099+01	.4318497+01	.6336080+01	.1854934+01	1	85
.2861677+01	.7980821+01	.2281032-00	.1248141+01	.9690045+01	-.9676575-00	1	86

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.7395572+01	-.3165006-00	.2605601-00	.9089960+01	-.1124694+01	-.9280157-00	1	93
.1086689+02	-.1491466+01	-.1449183+01	.1275017+02	-.1598095+01	-.1577161+01	1	94
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.4973421+01	.5413706+01	.1931105+01	.3425920+01	.3888309+01	.3563416+01	1	98
.1855874+01	.2425690+01	.5184266+01	.4072000-00	.1092169+01	.6806307+01	1	99
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-.1619218+01-.1599071+01 .1290304+02-.1619219+01-.1599073+01 .1514500+02   1 143
-.1619219+01-.1599074+01 .1750821+02 .0000000    .0000000    .0000000      1 144
          0
DIANE/SCAT UPLYFE    19 FREQ. TEMP.( 1.-2250.) C1/HT*-AFWL 11-28-690000
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     1125. .2100000E+02
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-.1618828+01	-.1603222+01	.1633694+02	-.1618346+01	-.1604631+01	.1858090+02	1	102
-.1618671+01	-.1604783+01	.2094411+02	.5828946+01	.1300000+02	.6258197+01	1	103

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 .1975539+02 .6551080+01 .1300000+02 .4533608+01 .5784759+01-.2986436+01    1 117
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-.1497041+01-.1343395+01 .1766551+01-.1508600+01-.1542523+01 .3376226+01    1 140
-.1606399+01-.1582295+01 .5070056+01-.1609788+01-.1589694+01 .6842024+01    1 141
-.1610340+01-.1590941+01 .8713828+01-.1610424+01-.1591137+01 .1075405+02    1 142
-.1610435+01-.1591162+01 .1289412+02-.1610436+01-.1591165+01 .1513608+02    1 143
-.1610436+01-.1591166+01 .1749924+02 .0000000    .0000000    .0000000       1 144
          1
DIANE/SCAT GIUFF   19 FREQ(.001-1.E6) TEMP(1.-2250.) C1/LMS 11/7/66
 .1900000+02 .8610000+03
     1105. .2100000E+02
 .0000000    .1300000+02 .6342381+01 .9857336+01-.1978742-00 .6720848+01    1   1
 .9651599+01 .1976810+01 .6638737+01 .9514818+01 .4531841+01 .6395561+01    1   2
 .9084592+01 .7143350+01 .5756304+01 .8229278+01 .9468759+01 .4818231+01    1   3
 .7135162+01 .1146995+02 .3.  5056+01 .6383667+01 .1363020+02 .2716024+01    1   4
 .4950495+01 .1605199+02 .1259798+01 .3233931+01 .1829475+02-.4611800-00    1   5
 .1412451+01 .2049140+02-.2108497+01-.5625348-00 .2270105+02-.3016697+01    1   6
-.2382798+01 .2495598+02-.3300871+01-.3205007+01 .2732079+02 .4054651-00    1   7
 .1300000+02 .9200978+01 .1134496+02 .1320996+01 .9044369+01 .1106969+02    1   8
 .3411180+01 .8786544+01 .1085370+02 .5778039+01 .8336226+01 .1027845+02    1   9
 .8011853+01 .7548231+01 .9196182+01 .1024455+02 .6418701+01 .7804317+01    1  10
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.1227831+02	.4966747+01	.6308258+01	.1417236+02	.3182621+01	.4456543+01	1	11
.1602885+02	.1192565+01	.2501877+01	.1792410+02	-.7652075-00	.4635127-0[illegible]	1	12
.1997757+02	-.2217912+01	-.1311470+01	.2218241+02	-.2793213+01	-.2398404+01	1	13
.2463246+02	-.2876610+01	-.2021045+01	.2714361+02	.3109302-00	.1300000+02	1	14
.1115852+02	.1200300+02	.2139347+01	.1078293+02	.1166660+02	.4268390+01	1	15
.1022690+02	.1119151+02	.6467727+01	.9231642+01	.1012761+02	.8478919+01	1	16
.7881636+01	.8744702+01	.1028112+02	.6342500+01	.7145312+01	.1196983+02	1	17
.4839991+01	.5575546+01	.1372025+02	.3239160+01	.4158711+01	.1564530+02	1	18
.1484984+01	.2576513+01	.1769814+02	-.4231195-00	.6282987-00	.1981362+02	1	19
-.1925072+01	-.1223310+01	.2200347+02	-.2575190+01	-.2373708+01	.2431177+02	1	20
-.2644674+01	-.2612550+01	.2678451+02	.1223775+01	.1300000+02	.1172467+02	1	21
.1194396+02	.2522395+01	.1122103+02	.1133357+02	.4486601+01	.1040096+02	1	22
.1060006+02	.6367910+01	.9324025+01	.9779222+01	.8159223+01	.8016325+01	1	23
.8657217+01	.9942290+01	.6531088+01	.7270786+01	.1172296+02	.4456045+01	1	24
.5652946+01	.1351604+02	.3146934+01	.3937031+01	.1536596+02	.1350616+01	1	25
.2195900+01	.1734161+02	-.4951699-00	.3445649-00	.1947901+02	-.1900489+01	1	26
-.1431012+01	.2165021+02	-.2424746+01	-.2324858+01	.2392473+02	-.2448588+01	1	27
-.2426769+01	.2638020+02	.1609438+01	.1300000+02	.1145528+02	.1163577+02	1	28
.2474112+01	.1089573+02	.1106708+02	.4263921+01	.1010072+02	.1047123+02	1	29
.6103234+01	.9137464+01	.9741375+01	.7918810+01	.7876686+01	.8484097+01	1	30
.9669177+01	.6323674+01	.6981206+01	.1140173+02	.4585887+01	.5305660+01	1	31
.1320045+02	.2781663+01	.3530038+01	.1502730+02	.9643433-00	.1783839+01	1	32
.1696411+02	-.6107105-00	-.2332845-01	.1908242+02	-.1926224+01	-.1567647+01	1	33
.2126318+02	-.2244034+01	-.2167379+01	.2357655+02	-.2263086+01	-.2243883+01	1	34
.2599714+02	.1945910+01	.1300000+02	.1118672+02	.1142436+02	.2287042+01	1	35
.1074420+02	.1091422+02	.4057516+01	.1008346+02	.1042622+02	.5862884+01	1	36
.8957613+01	.9577568+01	.7643937+01	.7378021+01	.8136021+01	.9388924+01	1	37
.5817122+01	.6585862+01	.1108449+02	.4179129+01	.4956075+01	.1286302+02	1	38
.2486620+01	.3284411+01	.1469965+02	.6596984-00	.1790757+01	.1664230+02	1	39
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.1076657+02	.3776047+01	.9718897+01	.1024459+02	.5553317+01	.8479390+01	1	43
.9287373+01	.7315269+01	.6950770+01	.7846003+01	.9040141+01	.5412837+01	1	44
.6304856+01	.1073599+02	.3637763+01	.4695471+01	.1251324+02	.2147082+01	1	45
.3036140+01	.1436751+02	.3170138-00	.1306775+01	.1632008+02	-.1207399+01	1	46
-.4552919-00	.1839014+02	-.1862335+01	-.1645589+01	.2056539+02	-.2014064+01	1	47
-.1981542+01	.2282465+02	-.2016447+01	-.2003293+01	.2521048+02	.2708050+01	1	48
.1300000+02	.1052564+02	.1095899+02	.1692070+01	.1021291+02	.1055729+02	1	49
.3418154+01	.9455022+01	.9993110+01	.5173465+01	.8255674+01	.8918182+01	1	50
.6923526+01	.6798032+01	.7473321+01	.6653330+01	.5083305+01	.5668652+01	1	51
.1035476+02	.3257667+01	.4126712+01	.1210959+02	.1429703+01	.2314281+01	1	52
.1391529+02	-.2477952-00	.5046958-00	.1581205+02	-.1444318+01	-.1057797+01	1	53
.1787629+02	-.1852025+01	-.1789328+01	.2004120+02	-.1928905+01	-.1916261+01	1	54
.2230592+02	-.1926768+01	-.1912775+01	.2469502+02	.3113515+01	.1300000+02	1	55
.1019536+02	.1066536+02	.1306765+01	.9934078+01	.1031334+02	.3037798+01	1	56
.9239760+01	.9579436+01	.4793727+01	.7909128+01	.8404294+01	.6525818+01	1	57
.6107129+01	.6792844+01	.8215212+01	.4361637+01	.5002418+01	.9868092+01	1	58
.2645847+01	.3280276+01	.1159309+02	.7997861-00	.1541915+01	.1339357+02	1	59
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.8758611+01	.4334373+01	.7046967+01	.7414270+01	.6033001+01	.5379486+01	1	64
.5833412+01	.7693243+01	.3667127+01	.4277732+01	.9339584+01	.1906727+01	1	65

.2737687+01	.1106710+02	.3181302-00	.1224645+01	.1287082+02	-.9941890-00	1	66
-.3827604-00	.1477198+02	-.1613803+01	-.1432946+01	.1683823+02	-.1749778+01	1	67
-.1706220+01	.1901156+02	-.1734039+01	-.1716685+01	.2129578+02	-.1709711+01	1	68
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.7183480+01	.3020230+01	.8742803+01	.8830332+01	.1336273+01	.2203253+01	1	72
.1056405+02	-.2424077-00	.7344910-00	.1238387+02	-.1244192+01	-.6279192-00	1	73
.1429530+02	-.1583977+01	-.1404674+01	.1637775+02	-.1641477+01	-.1608601+01	1	74
.1854663+02	-.1656002+01	-.1640717+01	.2079641+02	-.1655943+01	-.1642014+01	1	75
.2316201+02	.4248495+01	.1300000+02	.8422081+01	.9120515+01	.4859822-01	1	76
.6021034+01	.6467654+01	.1736064+01	.7194927+01	.7530615+01	.3425851+01	1	77
.5734365+01	.6221188+01	.5099197+01	.3984431+01	.4804317+01	.6770097+01	1	78
.2309880+01	.3376521+01	.6433576+01	.7222712-00	.1920800+01	.1017171+02	1	79
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-.1650576+01	-.1637747+01	.2029734+02	-.1652607+01	-.1638760+01	.2266122+02	1	82
.4605170+01	.1300000+02	.8222933+01	.8848271+01	-.4036073-00	.7726966+01	1	83
.8188057+01	.1280151+01	.6733717+01	.7109419+01	.2988746+01	.5115243+01	1	84
.5715672+01	.4676739+01	.3409521+01	.4267303+01	.6341460+01	.1738938+01	1	85
.2799644+01	.7983610+01	.1604473-00	.1190260+01	.9690440+01	-.9677469-00	1	86
-.3210212-00	.1146669+02	-.1453941+01	-.1293381+01	.1334009+02	-.1597529+01	1	87
-.1586091+01	.1538127+02	-.1640743+01	-.1630265+01	.1752299+02	-.1642573+01	1	88
-.1628583+01	.1977227+02	-.1627460+01	-.1613073+01	.2215169+02	.5010635+01	1	89
.1300000+02	.7611425+01	.8562564+01	-.9118936-00	.7217019+01	.7741046+01	1	90
.7921244-00	.6038689+01	.6463064+01	.2491152+01	.4369310+01	.4913367+01	1	91
.4150244+01	.2083929+01	.3350698+01	.5778166+01	.1046432+01	.1767596+01	1	92
.7393411+01	-.3267625-00	.2290327-00	.9090323+01	-.1131860+01	-.9267319-00	1	93
.1088879+02	-.1487666+01	-.1434056+01	.1275492+02	-.1588495+01	-.1565028+01	1	94
.1481190+02	-.1599475+01	-.1583665+01	.1696323+02	-.1599797+01	-.1585276+01	1	95
.1920767+02	-.1599613+01	-.1585432+01	.2157118+02	.5416100+01	.1300000+02	1	96
.6902806+01	.7915497+01	-.1420288+01	.6167391+01	.6790009+01	.2663371-00	1	97
.4924029+01	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	98
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	99
-.7217605-00	-.1010180+00	.6521007+01	-.1390331+01	-.1000058+01	.1030290+02	1	100
-.1549052+01	-.1407745+01	.1217703+02	-.1588201+01	-.1572486+01	.1421776+02	1	101
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.7107523+01	-.1968280+01	.5247085+01	.5873210+01	-.3063307-00	.4005578+01	1	104
.4628108+01	.1341066+01	.2541029+01	.3313011+01	.2777886+01	.9605622-00	1	105
.1690801+01	.4603050+01	-.3555075-00	.4495643-00	.6218781+01	-.1157615+01	1	106
-.7845127-00	.7914469+01	-.1457636+01	-.1393367+01	.9687622+01	-.1558217+01	1	107
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.7931888-00	.1756971+01	.2500705+01	.2418340+01	.2845437-00	.1001761+01	1	112
.4032722+01	-.7137233-00	-.3046690-00	.5644339+01	-.1263882+01	-.1166328+01	1	113
.7339389+01	-.1508063+01	-.1490096+01	.9111839+01	-.1579410+01	-.1566460+01	1	114
.1098393+02	-.1593065+01	-.1578310+01	.1302458+02	-.1594713+01	-.1579531+01	1	115
.1516499+02	-.1594890+01	-.1579630+01	.1740705+02	-.1594911+01	-.1579639+01	1	116
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.3965114+01	.4590499+01	-.1330060+01	.2680289+01	.3121721+01	.2995714-00	1	118
.1186998+01	.1629602+01	.1918556+01	-.1493574-00	.2074792-00	.3530957+01	1	119
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 .7465094+01-.1597283+01-.1578742+01 .9336898+01-.1597589+01-.1579265+01    1 135
 .1137712+02-.1597628+01-.1579331+01 .1351719+02-.1597633+01-.1579339+01    1 136
 .1575915+02-.1597633+01-.1579340+01 .1812236+02 .7718685+01 .1300000+02    1 137
 .6458226-00 .3183975+01-.4679664+01-.5578589-01 .1783411+01-.3058164+01    1 138
-.8803672-00 .3359822-00-.1440714+01-.1345014+01-.8227584-00 .1709941-00    1 139
-.1529411+01-.1381533+01 .1781433+01-.1586838+01-.1539291+01 .3391092+01    1 140
-.1600815+01-.1574002+01 .5004929+01-.1603661+01-.1580688+01 .6856897+01    1 141
-.1604158+01-.1581049+01 .8726701+01-.1604237+01-.1582033+01 .1076892+02    1 142
-.1604247+01-.1582057+01 .1290399+02-.1604248+01-.1582060+01 .1515095+02    1 143
-.1604249+01-.1582060+01 .1751416+02 .0000000    .0000000    .0000000       1 144
      56
DIAIR/SCAT REF-1A TEMP(1.5-2250.)EV. SADY INPUT TAPES(1819,1818) 11-8-67
 .1000000+01 .4640000+03
  1106.      .1900000+02                                                    1   0
 .4054651-00 .1000000+02 .8926806+01 .1145091+02 .1352577+01 .8808878+01    1   1
 .1121985+02 .3541557+01 .8641533+01 .1100100+02 .5891142+01 .8284119+01    1   2
 .1043205+02 .8165900+01 .7618075+01 .9266513+01 .1032272+02 .6568743+01    1   3
 .7036295+01 .1230595+02 .5121636+01 .6266330+01 .1418777+02 .3372307+01    1   4
 .4498705+01 .1604009+02 .1549009+01 .2670440+01 .1796065+02-.2555276-01    1   5
 .9021196-00 .2009843+02 .8109302-00 .1000000+02 .1109926+02 .1205968+02    1   6
 .2205454+01 .1077394+02 .1171839+02 .4344166+01 .1027336+02 .1122487+02    1   7
 .6522088+01 .9381773+01 .1019728+02 .8512111+01 .8095812+01 .8837648+01    1   8
 .1030023+02 .6082337+01 .7362920+01 .1201736+02 .5112719+01 .5882905+01    1   9
 .1383226+02 .3484536+01 .4305922+01 .1576249+02 .1690262+01 .2715354+01    1  10
 .1777246+02-.3911564-01 .8291052-00 .1987440+02 .1223775+01 .1000000+02    1  11
 .1178758+02 .1202831+02 .2559247+01 .1129837+02 .1145798+02 .4523764+01    1  12
 .1055921+02 .1085059+02 .6412750+01 .4515182+01 .1006589+02 .8231463+01    1  13
 .8176999+01 .8901661+01 .1003292+02 .6646287+01 .7455494+01 .1179860+02    1  14
 .4982897+01 .5817734+01 .1359439+02 .3320159+01 .4180517+01 .1547221+02    1  15
 .1574208+01 .2461787+01 .1744862+02-.1235042+00 .6439968-00 .1957487+02    1  16
 .1609438+01 .1000000+02 .1157594+02 .1178510+02 .2524895+01 .1112663+02    1  17
 .1126203+02 .4329929+01 .1033759+02 .1073228+02 .6181299+01 .9394073+01    1  18
 .9988273+01 .7997572+01 .6039868+01 .8775154+01 .9761432+01 .6416511+01    1  19
 .7235478+01 .1150232+02 .4760568+01 .5574598+01 .1330049+02 .3009852+01    1  20
 .3823843+01 .1514635+02 .1214892+01 .2059039+01 .1708827+02-.4330207-00    1  21
 .2411105-00 .1910601+02 .1945910+01 .1000000+02 .1133208+02 .1163304+02    1  22
 .2352717+01 .1099436+02 .1110347+02 .4130176+01 .1034004+02 .1067590+02    1  23
 .5947768+01 .9181879+01 .9764866+01 .7731841+01 .7647806+01 .8353136+01    1  24
 .9484633+01 .6080230+01 .6784736+01 .1119509+02 .4351703+01 .5136385+01    1  25
 .1296973+02 .2600881+01 .3394095+01 .1479222+02 .8370342-00 .1788800+01    1  26
 .1671385+02-.6784426-00-.8926094-02 .1880127+02 .2302585+01 .1000000+02    1  27
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 .1091523+02 .1143000+02 .2097607+01 .1071799+02 .1048860+02 .3865851+01    1  28
 .1007993+02 .1045074+02 .5643783+01 .8832260+01 .9364659+01 .7399724+01    1  29
 .7187412+01 .7876952+01 .9125502+01 .5613245+01 .6296933+01 .1081191+02    1  30
 .3945126+01 .4634065+01 .1256898+02 .2194480+01 .2967282+01 .1440154+02    1  31
 .4011351-00 .1224873+01 .1633345+02-.9334554-00-.4297087-00 .1340220+02    1  32
 .2706050+01 .1000000+02 .1044220+02 .1108981+02 .1765662+01 .1024540+02    1  33
 .1061944+02 .3497653+01 .9592608+01 .9930719+01 .5252033+01 .8328913+01    1  34
 .6745918+01 .6977674+01 .6775918+01 .7291955+01 .8682055+01 .5061203+01    1  35
 .5702898+01 .1036658+02 .3227458+01 .3957058+01 .1211234+02 .1412502+01    1  36
 .2151637+01 .1391167+02-.1465963-00 .4149063-00 .1580364+02-.1164542+01    1  37
-.9414739-00 .1786352+02 .3113515+01 .1000000+02 .1005011+02 .1065392+02    1  38
 .1360020+01 .9794949+01 .1019212+02 .3087890+01 .9069250+01 .9378240+01    1  39
 .4816446+01 .7742590+01 .7990235+01 .6530797+01 .5978846+01 .6366944+01    1  40
 .6203301+01 .4209569+01 .4746372+01 .9854134+01 .2571041+01 .3101169+01    1  41
 .1157840+02 .6447396-00 .1443689+01 .1337690+02-.5529675-00-.4217263-01    1  42
 .1529038+02-.1295507+01-.1104574+01 .1737620+02 .3526360+01 .6000000+01    1  43
 .9566801+01 .1016395+02 .9147167-00 .9120658+01 .9553957+01 .2631614+01    1  44
 .6206567+01 .8549792+01 .4336353+01 .6730981+01 .7106534+01 .6014437+01    1  45
 .5079657+01 .5650146+01 .7677060+01 .3477630+01 .4213701+01 .9338155+01    1  46
 .3912023+01 .6000000+01 .9196162+01 .9682416+01 .4699944-00 .8578502+01    1  47
 .8966970+01 .2162424+01 .7518772+01 .7983591+01 .3861739+01 .5916971+01    1  48
 .6617202+01 .5544942+01 .4443431+01 .5281614+01 .7215101+01 .2881378+01    1  49
 .3896679+01 .6678140+01 .4248495+01 .8000000+01 .6881964+01 .9326650+01    1  50
 .5983360-01 .8249766+01 .6620668+01 .1762315+01 .8882644+01 .9327451+01    1  51
 .5935448-01 .8249788+01 .6620668+01 .1762315+01 .7155199+01 .7616941+01    1  52
 .3450090+01 .5526361+01 .6226812+01 .5138778+01 .3821185+01 .4823604+01    1  53
 .6810291+01 .2111361+01 .3356310+01 .6466352+01 .4605170+01 .6000000+01    1  54
 .6537986+01 .9022980+01-.3737122-00 .7922648+01 .6224138+01 .1324182+01    1  55
 .6727643+01 .7089911+01 .3024039+01 .5113300+01 .5677471+01 .4701928+01    1  56
 .3285595+01 .4189867+01 .6356935+01 .1572676+01 .2669362+01 .7991797+01    1  57
 .5010635+01 .6009000+01 .7784644+01 .8588496+01-.8819303-00 .7191169+01    1  58
 .7676353+01 .8232141-00 .6021005+01 .6337203+01 .2504389+01 .4391443+01    1  59
 .4781937+01 .4154170+01 .2636901+01 .3150647+01 .5778804+01 .1014041+01    1  60
 .1553506+01 .7393796+01 .5416100+01 .6000000+01 .6746161+01 .7846465+01    1  61
-.1396553+01 .5962768+01 .6720433+01 .2841906-00 .4696295+01 .5221803+01    1  62
 .1935095+01 .3136792+01 .3647715+01 .3561490+01 .1598048+01 .2237596+01    1  63
 .5183480+01 .1951048-00 .9623943-00 .6807775+01 .5828946+01 .6000000+01    1  64
 .5971420+01 .6963563+01-.1950553+01 .4936915+01 .5694486+01-.2988722-00    1  65
 .3615542+01 .4416069+01 .1330231+01 .2072908+01 .3144276+01 .2971890+01    1  66
 .5323356-00 .1743520+01 .4590056+01-.5984488-00 .3587404-00 .6212626+01    1  67
 .6214608+01 .6000000+01 .5331142+01 .6262835+01-.2492295+01 .4508515+01    1  68
 .5163779+01-.6456521-00 .3063263+01 .3783490+01 .7875002-00 .1373671+01    1  69
 .2282935+01 .2409632+01-.3018415-01 .7675013-00 .4024617+01-.9145189-00    1  70
-.5166674-00 .5636089+01 .6551080+01 .4000000+01 .4353814+01 .5656920+01    1  71
-.2965679+01 .3461434+01 .4421383+01-.1333000+01 .2031924+01 .2865975+01    1  72
 .2917569-00 .5712825-00 .1377425+01 .1908540+01 .6907755+01 .4000000+01    1  73
 .2897134+01 .4907768+01-.3484610+01 .1773010+01 .3530612+01-.1859595+01    1  74
 .4101817-00 .1980674+01-.2381293-00-.7382239-00 .4405983-00 .1375212+01    1  75
 .7718685+01 .4000000+01-.8816165-01 .2738894+01-.4686896+01-.9638246-00    1  76
 .1267920+01-.3065075+01-.1412205+01-.1671261-00-.1449881+01-.1574346+01    1  77
-.1197488+01 .1602400-00 .0000000    .0000000    .0000000    .0000000       1  78
         50
DIANE/SCAT  SEA WATER-1A  TEMP(1.-1.E4 EV)  1 FREQ.  CI/JM  10-9-67
 .1000000+01 .9840000+03
   1138.     .2400000+02                                                    1   0
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.4054651-00	.1300000+02	.9070314+01	.1316248+02	.1245527+01	.8423728+01	1	1
.1282334+02	.3229571+01	.8169887+01	.1266874+02	.5545761+01	.7864971+01	1	2
.1200709+02	.6260290+01	.7267011+01	.1062576+02	.1085060+02	.6016017+01	1	3
.6925489+01	.1300130+02	.4230730+01	.7139141+01	.1487128+02	.2254415+01	1	4
.5158328+01	.1600166+02	.2762316-00	.3178981+01	.1858084+02	-.1314397+01	1	5
.1124927+01	.2000560+02	-.2169564+01	-.8130693-00	.2277281+02	-.2399169+01	1	6
-.1960997+01	.2513563+02	-.2422035+01	-.2356177+01	.2760969+02	.8109302-00	1	7
.1300000+02	.1117920+02	.1300014+02	.2366583+01	.1000977+02	.1346996+02	1	8
.4695000+01	.1026549+02	.1297021+02	.7065666+01	.9178256+01	.1163728+02	1	9
.9161447+01	.7507469+01	.9676538+01	.1094982+02	.5726193+01	.7793992+01	1	10
.1260699+02	.4062350+01	.6067024+01	.1433405+02	.2749446+01	.4477479+01	1	11
.1618733+02	.1354903+01	.2653598+01	.1817879+02	-.4392896-00	.8948432-01	1	12
.2026957+02	-.1769603+01	-.9900095-00	.2242184+02	-.2265767+01	-.2076269+01	1	13
.2468863+02	-.2284501+01	-.2243150+01	.2715659+02	.1223775+01	.1300000+02	1	14
.1267044+02	.1367425+02	.3052091+01	.1201578+02	.1300300+02	.5093264+01	1	15
.1106286+02	.1222334+02	.7007664+01	.9637914+01	.1091019+02	.8773235+01	1	16
.8115655+01	.9309405+01	.1049416+02	.6478841+01	.7672904+01	.1221258+02	1	17
.4675039+01	.5930372+01	.1396452+02	.2888217+01	.4145367+01	.1577054+02	1	18
.1284649+01	.2400878+01	.1771931+02	-.3671857-00	.8125214-00	.1985301+02	1	19
-.1632976+01	-.1108345+01	.2202527+02	-.2077400+01	-.1951460+01	.2430228+02	1	20
-.2072269+01	-.2041531+01	.2676050+02	.1609438+01	.1300000+02	.1302660+02	1	21
.1326220+02	.3020412+01	.1236172+02	.1271572+02	.4838598+01	.1119387+02	1	22
.1208543+02	.6645436+01	.9627678+01	.1078768+02	.8407742+01	.7930646+01	1	23
.9094080+01	.1010466+02	.6307644+01	.7452309+01	.1179574+02	.4617225+01	1	24
.5722733+01	.1357670+02	.2792234+01	.3912537+01	.1540400+02	.1095275+01	1	25
.2235131+01	.1734296+02	-.5666609-00	.4526370-00	.1946442+02	-.1593813+01	1	26
-.1149759+01	.2164706+02	-.1864925+01	-.1769264+01	.2396270+02	-.1875889+01	1	27
-.1850920+01	.2830517+02	.1945910+01	.1300000+02	.1262295+02	.1294883+02	1	28
.2777660+01	.1211191+02	.1251826+02	.4553117+01	.1096515+02	.1188910+02	1	29
.6328027+01	.9489293+01	.1059143+02	.8057068+01	.7735578+01	.8944119+01	1	30
.9774750+01	.6040577+01	.7229841+01	.1146410+02	.4474232+01	.5498731+01	1	31
.1324382+02	.2747482+01	.3745447+01	.1508322+02	.9596773-00	.2054260+01	1	32
.1702808+02	-.8830296-00	.2528369-00	.1913621+02	-.1502478+01	-.1168923+01	1	33
.2133811+02	-.1707040+01	-.1650181+01	.2383970+02	-.1743943+01	-.1722826+01	1	34
.2601736+02	.2302585+01	.1300000+02	.1194032+02	.1260916+02	.2469860+01	1	35
.1162030+02	.1223066+02	.4232819+01	.1062140+02	.1161356+02	.5969121+01	1	36
.9164510+01	.1029417+02	.7697675+01	.7602617+01	.8644416+01	.9421124+01	1	37
.5967407+01	.6950794+01	.1111694+02	.4199864+01	.5196736+01	.1289438+02	1	38
.2427026+01	.3447453+01	.1473520+02	.5727550-00	.1662548+01	.1666956+02	1	39
-.9369863-00	-.1332299-00	.1873447+02	-.1576347+01	-.1350216+01	.2087906+02	1	40
-.1722920+01	-.1662911+01	.2312222+02	-.1742236+01	-.1724502+01	.2548605+02	1	41
.2708050+01	.1300000+02	.1098682+02	.1209828+02	.2088948+01	.1084310+02	1	42
.1177563+02	.3835252+01	.1022558+02	.1105044+02	.5566574+01	.9032275+01	1	43
.9669273+01	.7291653+01	.7347596+01	.7964776+01	.9006634+01	.5454349+01	1	44
.6176133+01	.1069404+02	.3398661+01	.4295398+01	.1243156+02	.1414074+01	1	45
.2434253+01	.1421672+02	-.3152867-00	.5905908-00	.1609172+02	-.1342246+01	1	46
-.9546343-00	.1813317+02	-.1646751+01	-.1601741+01	.2027431+02	-.1724049+01	1	47
-.1711730+01	.2251759+02	-.1741248+01	-.1723780+01	.2488155+02	.3113515+01	1	48
.1300000+02	.9845139+01	.1148278+02	.1672926+01	.9728796+01	.1108683+02	1	49
.3408313+01	.9291782+01	.1019703+02	.5128427+01	.8155811+01	.8572520+01	1	50
.6836514+01	.6347823+01	.6730674+01	.8507501+01	.4269362+01	.4908915+01	1	51
.1013972+02	.2295699+01	.3099981+01	.1184005+02	.5063691-00	.1296859+01	1	52
.1361447+02	-.8101634-00	-.3679829-00	.1548769+02	-.1470597+01	-.1410814+01	1	53
.1752892+02	-.1693871+01	-.1681528+01	.1966984+02	-.1735348+01	-.1718023+01	1	54
.2191263+02	-.1739403+01	-.1721150+01	.2427684+02	.3526360+01	.1300000+02	1	55

.6665674+01	.1063710+02	.1206839+01	.8412427+01	.1004635+02	.2915384+01	1	56
.7780201+01	.6932365+01	.4614878+01	.6614190+01	.7187704+01	.6273524+01	1	57
.5039664+01	.5415703+01	.7909236+01	.3264952+01	.3691839+01	.9528654+01	1	58
.1446937+01	.1925295+01	.1122562+02	-.1511699-00	.2412285-00	.1299914+02	1	59
-.1197891+01	-.1048884+01	.1467300+02	-.1620458+01	-.1568548+01	.1692137+02	1	60
-.1675063+01	-.1641644+01	.1909989+02	-.1632805+01	-.1611096+01	.2139923+02	1	61
-.1596856+01	-.1578029+01	.2380046+02	.3912023+01	.1300000+02	.7797999+01	1	62
.9706659+01	.7541540-00	.7396314+01	.6894511+01	.2413147+01	.6719872+01	1	63
.7627595+01	.4079461+01	.5459869+01	.6036732+01	.5714172+01	.3810324+01	1	64
.4419194+01	.7336456+01	.2095139+01	.2884396+01	.8959898+01	.5890441-00	1	65
.1596287+01	.1067586+02	-.5837898-00	.4875532-00	.1249762+02	-.1290688+01	1	66
-.6415374-00	.1441615+02	-.1496196+01	-.1286858+01	.1651242+02	-.1515991+01	1	67
-.1466631+01	.1868617+02	-.1517523+01	-.1495812+01	.2093717+02	-.1517634+01	1	68
-.1499017+01	.2330124+02	.4246495+01	.1300000+02	.7578164+01	.9180064+01	1	69
.2955042-00	.6961777+01	.8174546+01	.1947210+01	.6074658+01	.6807232+01	1	70
.3591835+01	.4663968+01	.5546977+01	.5235533+01	.2968758+01	.4366802+01	1	71
.6666354+01	.1452686+01	.3230392+01	.8555154+01	.1441897-00	.1910887+01	1	72
.1030190+02	-.8518457-00	.4839956-00	.1211885+02	-.1350578+01	-.7864132-00	1	73
.1400740+02	-.1486366+01	-.1369971+01	.1605099+02	-.1509206+01	-.1482511+01	1	74
.1819194+02	-.1513699+01	-.1496538+01	.2043445+02	-.1515708+01	-.1497583+01	1	75
.2279822+02	.4605170+01	.1300000+02	.7636415+01	.6966730+01	-.2022921-00	1	76
.6828043+01	.6091946+01	.1456427+01	.5670745+01	.6974361+01	.3126202+01	1	77
.4100040+01	.5661969+01	.4603923+01	.2408417+01	.4341411+01	.6474653+01	1	78
.8026413-00	.2872668+01	.6122101+01	-.4641747-00	.1260935+01	.9829115+01	1	79
-.1152978+01	-.2303277-00	.1160437+02	-.1395580+01	-.1172170+01	.1347721+02	1	80
-.1467588+01	-.1446699+01	.1551602+02	-.1505351+01	-.1491482+01	.1765828+02	1	81
-.1514643+01	-.1496862+01	.1990026+02	-.1515768+01	-.1497431+01	.2226348+02	1	82
.5010635+01	.1300000+02	.7735168+01	.8776437+01	-.7452239-00	.6785114+01	1	83
.7933558+01	.9367200-00	.5429678+01	.6557082+01	.2624912+01	.3742614+01	1	84
.4996697+01	.4286743+01	.1637769+01	.3383159+01	.5915407+01	.2550796-00	1	85
.1782130+01	.7530266+01	-.6992161-00	.2455132-00	.9225570+01	-.1145117+01	1	86
-.9131741-00	.1099793+02	-.1391344+01	-.1381729+01	.1286981+02	-.1494447+01	1	87
-.1481622+01	.1491005+02	-.1513240+01	-.1495615+01	.1705015+02	-.1515318+01	1	88
-.1496997+01	.1929237+02	-.1514324+01	-.1496531+01	.2165622+02	.5416100+01	1	89
.1300000+02	.6907201+01	.6183227+01	-.1270193+01	.6012264+01	.6988599+01	1	90
.4121270-00	.4614764+01	.5392645+01	.2066174+01	.2900394+01	.3766060+01	1	91
.3697089+01	.1206208+01	.2154746+01	.5312846+01	-.6322155-01	.6283131-00	1	92
.6923665+01	-.8945582-00	-.6402363-00	.8617842+01	-.1329660+01	-.1287778+01	1	93
.1039008+02	-.1480040+01	-.1460594+01	.1226243+02	-.1509486+01	-.1490998+01	1	94
.1430333+02	-.1513373+01	-.1495013+01	.1644378+02	-.1513845+01	-.1495468+01	1	95
.1868583+02	-.1513695+01	-.1495498+01	.2104907+02	.5828946+01	.1300000+02	1	96
.5397169+01	.7176717+01	-.1828588+01	.4376185+01	.5726274+01	-.1710793-00	1	97
.3115847+01	.4206192+01	.1459496+01	.1706218+01	.2652311+01	.3081928+01	1	98
.3294098-00	.1108452+01	.4694763+01	-.6888060-00	-.2258772-00	.6305502+01	1	99
-.1251038+01	-.1099510+01	.8000091+01	-.1453289+01	-.1414801+01	.9772412+01	1	100
-.1502219+01	-.1462669+01	.1164432+02	-.1512230+01	-.1493827+01	.1368457+02	1	101
-.1513717+01	-.1495299+01	.1582464+02	-.1513896+01	-.1495474+01	.1806660+02	1	102
-.1513915+01	-.1495492+01	.2042981+02	.6214608+01	.1300000+02	.4063753+01	1	103
.6106467+01	-.2373568+01	.3282171+01	.4782520+01	-.7298630-00	.2052535+01	1	104
.3237767+01	.8896825-00	.6714396-00	.1705288+01	.2505338+01	-.4461958-00	1	105
.2895060-00	.4117745+01	-.1101331+01	-.8070363-00	.5728008+01	-.1401452+01	1	106
-.1329227+01	.7322041+01	-.1491673+01	-.1463958+01	.9194050+01	-.1511418+01	1	107
-.1490927+01	.1116566+02	-.1514633+01	-.1495224+01	.1310608+02	-.1515030+01	1	108
-.1495759+01	.1524615+02	-.1515077+01	-.1495822+01	.1748811+02	-.1515082+01	1	109
-.1495829+01	.1985132+02	.6551080+01	.1300000+02	.3149894+01	.5388528+01	1	110

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-.2840344+01 .2319954+01 .3945220+01-.1229642+01 .1192725+01 .2434616+01    1 111
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 .3613396+01-.1343458+01-.1158724+01 .5223401+01-.1482905+01-.1427282+01    1 113
 .6917356+01-.1515583+01-.1486221+01 .8689346+01-.1521472+01-.1496836+01    1 114
 .1056115+02-.1522449+01-.1498526+01 .1260138+02-.1522577+01-.1498749+01    1 115
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-.1500635+01-.1409412+01 .4686405+01-.1537277+01-.1491680+01 .6382347+01    1 120
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-.1544824+01-.1511167+01 .1644034+02-.1544824+01-.1511170+01 .1081160+02    1 123
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-.1535463+01 .7546130+01-.1576703+01-.1536650+01 .9417944+01-.1576762+01    1 128
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-.1536866+01 .1564019+02-.1576770+01-.1536866+01 .1820340+02 .7718685+01    1 130
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 .1523199+02-.1605473+01-.1570096+01 .1759520+02 .6131531+01 .1300000+02    1 137
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-.1626883+01-.1602722+01 .1697594+02 .8517193+01 .1300000+02-.1270196+01    1 144
 .6976649-00-.5783218+01-.1527325+01-.4528968-00-.4165701+01-.1608453+01    1 145
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-.1615394+01 .6643625-00-.1641279+01-.1627589+01 .2274261+01-.1641693+01    1 147
-.1630105+01 .3968192+01-.1641773+01-.1630577+01 .5740177+01-.1641787+01    1 148
-.1630659+01 .7611984+01-.1641789+01-.1630672+01 .9652206+01-.1641789+01    1 149
-.1630674+01 .1179227+02-.1641789+01-.1630674+01 .1403423+02-.1655136+01    1 150
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 .1589273+02 .9210340+01 .1300000+02-.1516826+01-.6278840-00-.6822181+01    1 158
-.1615134+01-.1417291+01-.5205186+01-.1644926+01-.1629237+01-.3595624+01    1 159
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-.1655017+01-.1667914+01 .1234598+01-.1655114+01-.1668110+01 .2928471+01    1 161
-.1655132+01-.1668147+01 .4700457+01-.1655135+01-.1668153+01 .6572264+01    1 162
-.1655136+01-.1668154+01 .8612485+01-.1655136+01-.1668154+01 .1075255+02    1 163
-.1655136+01-.1668154+01 .1299451+02-.1655136+01-.1668154+01 .1535772+02    1 164
        58
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DIANE/SCAT S-1A TEMP(50.-10000.)EV. SADY INPUT TAPE 3327 11-8-67
 .1000000+01 .6150000+03
   1016.     .1500000+02                                                    1   0
 .3912023+01 .1300000+02 .9744300+01 .1079293+02 .1003783+00 .8887201+01    1   1
 .1034709+02 .1815430+01 .7602415+01 .9403572+01 .3543186+01 .6705317+01    1   2
 .8204542+01 .5271718+01 .5302101+01 .6329358+01 .6994720+01 .3756895+01    1   3
 .4603933+01 .6698197+01 .2026313+01 .2976057+01 .1047844+02 .3510056-00    1   4
 .1323752+01 .1232020+02-.4390775-00-.2415521-00 .1425469+02-.1566184+01    1   5
-.1340085+01 .1631917+02-.1720166+01-.1675667+01 .1846364+02-.1744880+01    1   6
-.1723480+01 .2070615+02-.1748023+01-.1730720+01 .2306942+02 .4248495+01    1   7
 .1300000+02 .9435433+01 .1054030+02-.2327864-00 .6910145+01 .1009145+02    1   8
 .1497665+01 .7975221+01 .9135135+01 .3230312+01 .6708227+01 .7683347+01    1   9
 .4957336+01 .5064476+01 .5832302+01 .6674927+01 .3204592+01 .4083445+01    1  10
 .8365898+01 .1366245+01 .2369392+01 .1011139+02-.3063144-00 .6331549-00    1  11
 .1190249+02-.1307723+01-.8435308-00 .1377846+02-.1651512+01-.1565642+01    1  12
 .1561938+02-.1725611+01-.1710775+01 .1795954+02-.1745723+01-.1729082+01    1  13
 .2020151+02-.1749171+01-.1731028+01 .2256472+02 .4605170+01 .1300000+02    1  14
 .8585948+01 .1004604+02-.5937309-00 .8325992+01 .9525036+01 .1142691+01    1  15
 .7625022+01 .8439213+01 .2871092+01 .6173334+01 .6772923+01 .4580960+01    1  16
 .4129978+01 .4884055+01 .6260843+01 .2145332+01 .3150614+01 .7897602+01    1  17
 .3969585-00 .1360460+01 .9598679+01-.8694948-00-.2715603-00 .1137213+02    1  18
-.1460568+01-.1329831+01 .1324420+02-.1680449+01-.1670037+01 .1528447+02    1  19
-.1739207+01-.1723319+01 .1742454+02-.1748474+01-.1730434+01 .1966651+02    1  20
-.1749335+01-.1731032+01 .2202983+02 .5010635+01 .1300000+02 .7295358+01    1  21
 .9256739+01-.1040621+01 .6894156+01 .8573594+01 .6906297-00 .6068744+01    1  22
 .7162986+01 .2348164+01 .4626539+01 .5271628+01 .4047460+01 .2918842+01    1  23
 .3512312+01 .5680623+01 .1205406+01 .1869009+01 .7296670+01-.2598615-00    1  24
 .2490588-00 .6991966+01-.1192049+01-.1012414+01 .1076433+02-.1613761+01    1  25
-.1576758+01 .1263692+02-.1723765+01-.1700486+01 .1468252+02-.1713906+01    1  26
-.1692677+01 .1684945+02-.1671210+01-.1652044+01 .1913638+02-.1630291+01    1  27
-.1611773+01 .2154082+02 .5416100+01 .1300000+02 .5965108+01 .8211526+01    1  28
-.1533025+01 .5243360+01 .7214080+01 .1652172-00 .4089756+01 .5660987+01    1  29
 .1822621+01 .2701253+01 .3960287+01 .3455653+01 .1243005+01 .2331026+01    1  30
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 .8406135+01-.1447460+01-.8636038-00 .1021607+02-.1593287+01-.1337876+01    1  32
 .1213038+02-.1613654+01-.1548294+01 .1419556+02-.1615272+01-.1591521+01    1  33
 .1634091+02-.1615524+01-.1597078+01 .1858355+02-.1615987+01-.1597677+01    1  34
 .2094684+02 .5826946+01 .1300000+02 .5163293+01 .7089772+01-.2079423+01    1  35
 .4167188+01 .6101058+01-.4166705-00 .2886572+01 .4661787+01 .1228115+01    1  36
 .1555801+01 .3418076+01 .2866569+01 .3551076-00 .2387584+01 .4518917+01    1  37
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-.1505536+01-.1098807+01 .9666608+01-.1580357+01-.1503259+01 .1154185+02    1  39
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-.1615624+01-.1597590+01 .1796437+02-.1615688+01-.1597639+01 .2032758+02    1  41
 .6214608+01 .1300000+02 .5297632+01 .6706289+01-.2598035+01 .4074703+01    1  42
 .5634455+01-.9467739-00 .2737455+01 .4530861+01 .7115879-00 .1264287+01    1  43
 .3294209+01 .2371562+01-.6329108-01 .1885133+01 .4006805+01-.9198483-00    1  44
 .4356240-00 .5623696+01-.1314191+01-.7985060-00 .7319451+01-.1500726+01    1  45
-.1438022+01 .9091753+01-.1597900+01-.1580640+01 .1096362+02-.1613739+01    1  46
-.1595830+01 .1300385+02-.1614727+01-.1596983+01 .1514391+02-.1614828+01    1  47
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 .1300000+02 .5325026+01 .6402861+01-.3062222+01 .4255087+01 .5369638+01    1  49
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 .1893064+01-.1950729-00 .1014468+01 .3509832+01-.9396022-00-.3432934-00    1  51
 .5120941+01-.1402854+01-.1283075+01 .6815078+01-.1584194+01-.1556721+01    1  52
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 .1249914+02-.1613478+01-.1596165+01 .1463921+02-.1613511+01-.1596219+01   1  54
 .1688117+02-.1613514+01-.1596225+01 .1924438+02 .6907755+01 .1300000+02   1  55
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 .2015645+01 .3036245+01-.2565927-00 .4557049-00 .1480756+01 .1362929+01   1  57
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-.1570697+01-.1525714+01 .6280110+01-.1611030+01-.1588618+01 .8052098+01   1  59
-.1614480+01-.1596222+01 .9923906+01-.1614957+01-.1597350+01 .1196413+02   1  60
-.1615021+01-.1597499+01 .1410419+02-.1615028+01-.1597517+01 .1634615+02   1  61
-.1615029+01-.1597519+01 .1870936+02 .7313220+01 .1300000+02 .2965662+01   1  62
 .4899956+01-.4122499+01 .1762887+01 .3481617+01-.2483735+01 .3617111-00   1  63
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-.1582921+01 .5671922+01-.1622093+01-.1603472+01 .7443902+01-.1623277+01   1  66
-.1606761+01 .9315708+01-.1623469+01-.1607284+01 .1135593+02-.1623494+01   1  67
-.1607353+01 .1349600+02-.1623497+01-.1607361+01 .1573796+02-.1623498+01   1  68
-.1607362+01 .1810117+02 .7716685+01 .1300000+02 .1350257+01 .3904669+01   1  69
-.4715043+01-.9861305-02 .2358590+01-.3085164+01-.9273155-00 .8921359-00   1  70
-.1466246+01-.1397016+01-.4874620-00 .1481107-00-.1569400+01-.1328007+01   1  71
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 .5063728+01-.1634664+01-.1622454+01 .6835705+01-.1635089+01-.1623848+01   1  73
 .8707510+01-.1635157+01-.1624069+01 .1074773+02-.1635166+01-.1624098+01   1  74
 .1288780+02-.1635167+01-.1624101+01 .1512976+02-.1635167+01-.1624102+01   1  75
 .1749297+02 .8131531+01 .1300000+02-.1474949-00 .2759501+01-.5321459+01   1  76
-.9307577-00 .1400358+01-.3695208+01-.1395593+01-.4486262-01-.2081614+01   1  77
-.1572026+01-.1130700+01-.4709925-00-.1625813+01-.1536260+01 .1140673+01   1  78
-.1640527+01-.1620731+01 .2750584+01-.1644148+01-.1636860+01 .4444462+01   1  79
-.1644797+01-.1639724+01 .6216437+01-.1644914+01-.1640228+01 .8088243+01   1  80
-.1644933+01-.1640307+01 .1012846+02-.1644935+01-.1640318+01 .1226853+02   1  81
-.1644935+01-.1640319+01 .1451049+02-.1644935+01-.1640319+01 .1687370+02   1  82
 .8517193+01 .1300000+02-.1060825+01 .1176001+01-.5884498+01-.1455176+01   1  83
-.2429300-00-.4272688+01-.1595811+01-.1252175+01-.2659822+01-.1639657+01   1  84
-.1600225+01-.1048242+01-.1651972+01-.1660419+01 .5621978-00-.1654979+01   1  85
-.1669122+01 .2172095+01-.1655640+01-.1670618+01 .3865969+01-.1655727+01   1  86
-.1670851+01 .5637944+01-.1655742+01-.1670892+01 .7509749+01-.1655745+01   1  87
-.1670898+01 .9549970+01-.1655745+01-.1670899+01 .1169004+02-.1655745+01   1  88
-.1670899+01 .1393200+02-.1655745+01-.1670899+01 .1629521+02 .8853665+01   1  89
 .1300000+02-.1273087+01 .5571208-00-.6387855+01-.1533838+01-.7508531-00   1  90
-.4776901+01-.1620631+01-.1463308+01-.3164387+01-.1646991+01-.1639668+01   1  91
-.1552911+01-.1653760+01-.1665970+01 .5749968-01-.1655468+01-.1670123+01   1  92
 .1667389+01-.1655691+01-.1670756+01 .3361261+01-.1655736+01-.1670875+01   1  93
 .5133235+01-.1655743+01-.1670895+01 .7005041+01-.1655745+01-.1670899+01   1  94
 .9045262+01-.1655745+01-.1670899+01 .1118533+02-.1655745+01-.1670899+01   1  95
 .1342729+02-.1655745+01-.1670899+01 .1579050+02 .9210340+01 .1300000+02   1  96
-.1423349+01-.7256554-01-.6922004+01-.1585093+01-.1161302+01-.5311598+01   1  97
-.1636333+01-.1579628+01-.3699284+01-.1651119+01-.1657427+01-.2087898+01   1  98
-.1654754+01-.1668626+01-.4775059-00-.1655604+01-.1670520+01 .1132378+01   1  99
-.1655718+01-.1670829+01 .2826249+01-.1655740+01-.1670887+01 .4590223+01   1 100
-.1655744+01-.1670897+01 .6470028+01-.1655745+01-.1670899+01 .8510249+01   1 101
-.1655745+01-.1670899+01 .1065032+02-.1655745+01-.1670899+01 .1289228+02   1 102
-.1655745+01-.1670899+01 .1525549+02 .0000000    .0000000    .0000000      1 103
           54
DIANE/SCAT  SHALE-1B  INPUT TAPES(4428,2408,4027)  11-7-67  CI/LN
 .1800800+01 .9840000+03
   1129.     .2400000+02                                                   1   0
```

.4054651-00	.1300000+02	.1209713+02	.1313172+02	.1407073+01	.1175684+02	1	1
.1273210+02	.3553500+01	.1108455+02	.1238831+02	.5814084+01	.9958061+01	1	2
.1142235+02	.7956449+01	.8481625+01	.9976416+01	.1007414+02	.6975009+01	1	3
.8390024+01	.1205625+02	.5509024+01	.6732670+01	.1395918+02	.3351515+01	1	4
.4820672+01	.1583413+02	.1279987+01	.2833694+01	.1773562+02	-.7071561-00	1	5
.7675641-00	.1979271+02	-.2177021+01	-.1080797+01	.2201375+02	-.2863699+01	1	6
-.2312408+01	.2449928+02	-.2983355+01	-.2892999+01	.2702304+02	.8109302-00	1	7
.1300000+02	.1312812+02	.1338820+02	.2100572+01	.1256820+02	.1297988+02	1	8
.4166685+01	.1173549+02	.1256182+02	.6301543+01	.1048103+02	.1148940+02	1	9
.8274792+01	.8899907+01	.9763972+01	.1008081+02	.7093512+01	.7914443+01	1	10
.1178098+02	.5253121+01	.6144491+01	.1355066+02	.3529425+01	.4560963+01	1	11
.1549705+02	.1[illegible]494+01	.2865041+01	.1757264+02	-.3121217-00	.8805373-00	1	12
.1969004+02	-.1889563+01	-.1033220+01	.2189704+02	-.2640660+01	-.2351530+01	1	13
.2421772+02	-.2726509+01	-.2681034+01	.2669498+02	.1223775+01	.1300000+02	1	14
.1304946+02	.1320282+02	.2382168+01	.1254682+02	.1270598+02	.4315073+01	1	15
.1172789+02	.1218456+02	.6181659+01	.1045852+02	.1115693+02	.7982703+01	1	16
.8840401+01	.9677084+01	.9790905+01	.7099170+01	.7961490+01	.1159444+02	1	17
.5245080+01	.6138686+01	.1340095+02	.3359784+01	.4317655+01	.1526423+02	1	18
.1464316+01	.2456853+01	.1724945+02	-.4352428-00	.5158792-00	.1938952+02	1	19
-.1915958+01	-.1339526+01	.2156104+02	-.2492831+01	-.2356796+01	.2383596+02	1	20
-.2531254+01	-.2503251+01	.2629244+02	.1609438+01	.1300000+02	.1272018+02	1	21
.1290964+02	.2325337+01	.1230217+02	.1252356+02	.4104277+01	.1155024+02	1	22
.1202675+02	.5956258+01	.1030521+02	.1089929+02	.7790547+01	.8597644+01	1	23
.9290960+01	.9558094+01	.6732369+01	.7517192+01	.1130407+02	.4829606+01	1	24
.5628998+01	.1310935+02	.2903664+01	.3734360+01	.1493800+02	.1052258+01	1	25
.1971748+01	.1687576+02	-.7455193-00	.1368546-00	.1899539+02	-.1952746+01	1	26
-.1536159+01	.2117602+02	-.2316265+01	-.2226161+01	.2349003+02	-.2347480+01	1	27
-.2323446+01	.2591117+02	.1945910+01	.1300000+02	.1223101+02	.1260711+02	1	28
.2158342+01	.1193725+02	.1224976+02	.3928757+01	.1119692+02	.1168631+02	1	29
.5744219+01	.9836409+01	.1040481+02	.7534808+01	.7933088+01	.8704504+01	1	30
.9290735+01	.6128175+01	.6920404+01	.1099350+02	.4395575+01	.5138034+01	1	31
.1277473+02	.2574431+01	.3368384+01	.1461257+02	.7244482-00	.1658427+01	1	32
.1655577+02	-.1003297+01	-.1635776-00	.1866384+02	-.1916176+01	-.1594696+01	1	33
.2087482+02	-.2131026+01	-.2073402+01	.2320500+02	-.2161023+01	-.2139858+01	1	34
.2559886+02	.2302585+01	.1300000+02	.1169093+02	.1225259+02	.1906721+01	1	35
.1141665+02	.1187767+02	.3061646+01	.1055862+02	.1123802+02	.5453303+01	1	36
.9111235+01	.9909040+01	.7210105+01	.7410783+01	.8234993+01	.8944984+01	1	37
.5693745+01	.6537660+01	.1064764+02	.3928641+01	.4804401+01	.1242827+02	1	38
.2169505+01	.3097611+01	.1428724+02	.3697033-00	.1377280+01	.1624503+02	1	39
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-.2073595+01	-.2032575+01	.2276220+02	-.2074109+01	-.2056026+01	.2515299+02	1	41
.2708050+01	.1300000+02	.1134137+02	.1180964+02	.1596253+01	.1095346+02	1	42
.1145385+02	.3319236+01	.1009904+02	.1068998+02	.5084488+01	.8754167+01	1	43
.9326838+01	.6830168+01	.7055973+01	.7649486+01	.8569340+01	.5246343+01	1	44
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 .7319067-00 .9897461+01 .1085215+02 .2534246+01 .9639211+01 .1049881+02   1  29
 .4270891+01 .8648297+01 .9385510+01 .6027271+01 .7103430+01 .7819036+01   1  30
 .7804063+01 .4842542+01 .5611734+01 .9651355+01 .1980540+01 .2888355+01   1  31
 .1146922+02-.6918092-00 .6933880-00 .1326139+02-.2723870+01-.1281603+01   1  32
 .1513679+02-.3860501+01-.3033119+01 .1718162+02-.4200774+01-.3950940+01   1  33
 .1935005+02-.4205536+01-.4138948+01 .2167527+02-.4145346+01-.4120961+01   1  34
 .2411632+02 .1945910+01 .1300000+02 .9472870+01 .1054456+02 .4370293-00   1  35
 .9476686+01 .1020670+02 .2200869+01 .9212809+01 .9843432+01 .4015945+01   1  36
 .7719025+01 .8265453+01 .5918749+01 .5087465+01 .5927753+01 .7661445+01   1  37
 .2529655+01 .3948036+01 .9292992+01 .5391710-00 .2210358+01 .1099927+02   1  38
-.1175502+01 .5841186-00 .1281015+02-.2630945+01-.9974273-00 .1476311+02   1  39
-.3565575+01-.2571380+01 .1689432+02-.3892409+01-.3582459+01 .1911848+02   1  40
-.3925723+01-.3859647+01 .2143775+02-.3890281+01-.3866089+01 .2386277+02   1  41
 .2302585+01 .1300000+02 .9155679+01 .1008136+02 .1601700-00 .9253297+01   1  42
 .98[illegible]2362+01 .2011652+01 .8070351+01 .9289900+01 .3862154+01 .6108320+01   1  43
 .7836537+01 .5546542+01 .4229220+01 .6236285+01 .7202652+01 .2614897+01   1  44
 .4564531+01 .8888549+01 .1037153+01 .2833993+01 .1067612+02-.5292762-00   1  45
 .1121121+01 .1253817+02-.1976500+01-.5997668-00 .1448875+02-.2959975+01   1  46
-.1902107+01 .1663097+02-.3359538+01-.1626954+01 .1909955+02-.3337997+01   1  47
-.3280960+01 .2150616+02-.3308039+01-.3292308+01 .2391514+02 .0000000      1  48
         33
DIANE/SCAT  XE-12A  TEMP(1-10)  12 FREQ  CI/RS  5-2-67  INPUT TAPE(S230)
 .1200000+02 .2870000+03
   1854.     .7000000+01
```

.0000000	.1300000+02	.1160196+02	.1399873+02	.4327391+01	.1012753+02	1	1
.1239795+02	.5935083+01	.8561137+01	.1082944+02	.7544161+01	.7406447+01	1	2
.9846203+01	.9154761+01	.6233477+01	.6807264+01	.1076517+02	.4870105+01	1	3
.7533651+01	.1237501+02	.3323347+01	.6041597+01	.1406891+02	.1642248+01	1	4
.4383736+01	.1584089+02	-.1522976-00	.2573075+01	.1771270+02	-.1998340+01	1	5
.5695526-00	.1975292+02	-.3371796+01	-.1495808+01	.2189299+02	-.3976369+01	1	6
-.3276636+01	.2413495+02	-.4151409+01	-.4040763+01	.2649816+02	.4054651-00	1	7
.1300000+02	.1160828+02	.1326247+02	.3718802+01	.1043232+02	.1178978+02	1	8
.5326967+01	.8894193+01	.1057692+02	.6936766+01	.7381175+01	.9335944+01	1	9
.8547215+01	.6036282+01	.7985933+01	.1015724+02	.4565258+01	.6544693+01	1	10
.1176689+02	.2951668+01	.4961195+01	.1346073+02	.1232760+01	.3254415+01	1	11
.1523270+02	-.5805355-00	.1421335+01	.1710450+02	-.2386845+01	-.5677402-00	1	12
.1914472+02	-.3614939+01	-.2443260+01	.2128479+02	-.4059094+01	-.3531970+01	1	13
.2352675+02	-.4163088+01	-.3773938+01	.2588996+02	.8109302-00	.1300000+02	1	14
.1094638+02	.1263957+02	.3109836+01	.1046265+02	.1150208+02	.4718447+01	1	15
.9282617+01	.1084437+02	.6328794+01	.7762082+01	.1009498+02	.7939232+01	1	16
.6284604+01	.8640959+01	.9549133+01	.4731859+01	.7069166+01	.1115872+02	1	17
.3070003+01	.5417734+01	.1285254+02	.1320268+01	.3769179+01	.1462450+02	1	18
-.5112979-00	.2204726+01	.1649630+02	-.2325537+01	.1120236+01	.1853653+02	1	19
-.3559241+01	.7643010-00	.2067659+02	-.4021824+01	.7562200-00	.2291855+02	1	20
-.4142716+01	.6645705-00	.2528180+02	.1223775+01	.1300000+02	.1011194+02	1	21
.1202252+02	.2488516+01	.9786210+01	.1118637+02	.4097886+01	.9286066+01	1	22
.1076641+02	.5709172+01	.8229016+01	.9872682+01	.7319919+01	.6798520+01	1	23
.8481194+01	.8929666+01	.5231941+01	.7022468+01	.1053945+02	.3552807+01	1	24
.5699012+01	.1223327+02	.1793122+01	.4854134+01	.1400525+02	-.5152120-01	1	25
.4363442+01	.1587744+02	-.1946409+01	.4087733+01	.1793832+02	-.3426922+01	1	26
.2482522+01	.2033476+02	-.3760089+01	-.1640039+01	.2263493+02	-.3809106+01	1	27
-.3759760+01	.2499696+02	.1609438+01	.1300000+02	.9823697+01	.1138498+02	1	28
.1903698+01	.9283341+01	.1071857+02	.3515435+01	.8789966+01	.1040448+02	1	29
.5129214+01	.6263435+01	.9886899+01	.6741063+01	.7322830+01	.8696246+01	1	30
.8351587+01	.5932719+01	.7481910+01	.9964829+01	.4152941+01	.6413978+01	1	31
.1172283+02	.1140038+01	.4204736+01	.1372343+02	-.1822663+01	.6863783-00	1	32
.1563371+02	-.3171280+01	-.2318725+01	.1767533+02	-.3729838+01	-.3541533+01	1	33
.1981647+02	-.3809338+01	-.3763806+01	.2206752+02	-.3774870+01	-.3751456+01	1	34
.2448309+02	.1945910+01	.1300000+02	.9819154+01	.1087764+02	.1383940+01	1	35
.9126053+01	.1033297+02	.3002869+01	.8432567+01	.9923368+01	.4625176+01	1	36
.7849561+01	.9144914+01	.6262174+01	.6858922+01	.7613118+01	.8020052+01	1	37
.4316268+01	.4975544+01	.9773148+01	.1625941+01	.2501353+01	.1148546+02	1	38
-.5356180-00	.6702459-00	.1326058+02	-.1808301+01	-.6972058-00	.1514331+02	1	39
-.2596932+01	-.1754459+01	.1723074+02	-.3301124+01	-.2921444+01	.1942791+02	1	40
-.3624132+01	-.3565925+01	.2168979+02	-.3662407+01	-.3643999+01	.2409135+02	1	41
.2302585+01	.1300000+02	.9428387+01	.1036301+02	.8446533-00	.9021461+01	1	42
.9920059+01	.2520565+01	.8194643+01	.9081217+01	.4282871+01	.6476947+01	1	43
.7443866+01	.6009758+01	.4716835+01	.5845844+01	.7646307+01	.3346218+01	1	44
.4456450+01	.9268272+01	.2228162+01	.3158927+01	.1099450+02	.9543184-00	1	45
.1844817+01	.1282648+02	-.7318137-00	.1117635+00	.1475540+02	-.2373256+01	1	46
-.1681466+01	.1687266+02	-.3197190+01	-.2941256+01	.1909729+02	-.3378402+01	1	47
-.3341878+01	.2142348+02	-.3355457+01	-.3341855+01	.2386695+02	.0000009	1	48

7

THIS IS THE END OF THE DIANE OPACITY TAPE - A. KNOPP 11/11/67

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APPENDIX III

EQUATION-OF-STATE AND RELATED PROGRAMS

Results of running HELAS and HELIKE were used as card input to MARIER. MARIER uses a polynomial fit among ionization potentials to obtain all unknown ionization potentials. The results of MARIER are used in the block data program MARI, which is used by GOLEM when GOLEM is used to run EIONX. TEDIUS computes number fractions for a given compound and these are used in DATA statements in EIONX. Input and format specifications for each code are given with the description of the code. The flow of information (dotted lines) and control (solid lines) is summarized in figure 1.

OPACITY PROGRAMS

AUGEAS creates an input data tape for DIAPHANOUS, which makes an input data tape for DIANE. DENSER condenses the DIAPHANOUS tape onto a new tape, which is edited by DASE. ANDIMX makes an opacity data tape from an 1100 binary tape converted from a LASL binary data tape. COMBO can combine DIAPHANOUS, ANDIMX, or DENSER tapes to produce a DENSER-like tape or an ANDIMX-like tape to be used by DIANE. IMESI is a calling program for DIANE, DIANTC, and DIANCT. DIANE uses a DENSER tape, an ANDIMX tape, or a DIAPHANOUS tape and creates a DIANE tape. DIANTC punches data cards or writes a DIANE BCD tape, or both, from a DIANE binary tape. DIANCT writes a DIANE binary tape from data cards punched by DIANCT or from a DIANE BCD tape.

IMES2 is a calling routine for GREYS, GREY, and REDGRE. Cards punched by DIANTC are used as input for GREYS, which makes a data tape

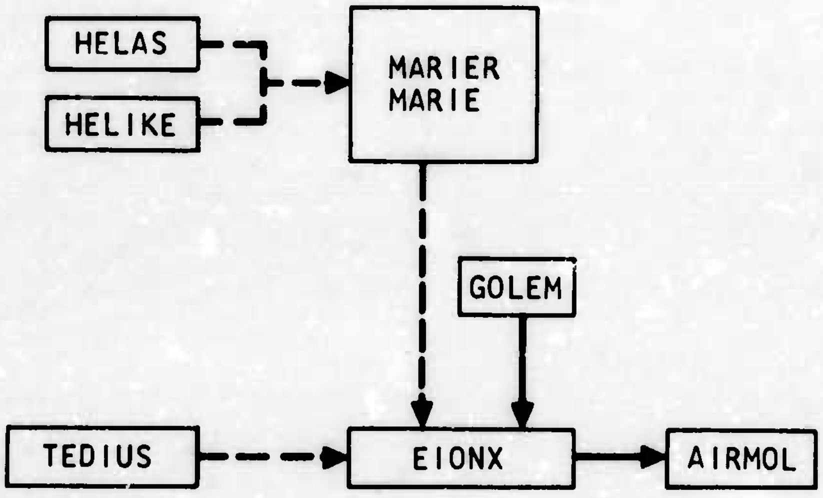

Figure 1. Equation-of-State and Related Programs General Flow

that is edited by EGREY. REDGRE condenses data from the GREY tape onto another data tape or punches cards in the form of DATA statements. Flow of information and control are summarized in figure 2.

PROCEDURE FOR CREATING A DIANE TAPE

AUGEAS is run to obtain an input data tape for DIAPHANOUS. This input tape must be mounted on unit 12. The card input and its formats are listed in reference 1b. AUGEAS can also be run with subroutines LEVELS and MARI as indicated in the LEVELS section of this report. To run DIAPHANOUS, the AUGEAS data tape must be mounted on unit 12 and the output tape written by DIAPHANOUS must be mounted on unit 15. The formats for the card input are listed in reference 1b. However, DIAPHANOUS has been modified slightly for use with another program. This modification necessitates that the first input card, a heading card, must not have columns 1 through 6 entirely blank for DIAPHANOUS to run in its normal mode.

LASL data tapes must be converted to 6600 binary tapes. These binary tapes are input to the ANDIMX code and must be mounted on unit 14. ANDIMX writes an output tape that must be mounted on unit 12. The card input and formats are listed in the ANDIMX section of this report.

A DIANE run is made by using a DASIAC DIAPHANOUS or SILVIA data tape, or a DIAPHANOUS tape, or an ANDIMX tape as input. If a DASIAC tape is used, the tape must be read in even parity at 556 BPI. The following routines are necessary to make a DIANE run:

IMESI is the main program and uses the following subroutines:

ALUETO, DIANTC, DIANE, DIAÑCT, DINNEW, DOLDIN, DYPDIN, EDIANE, PLNKUT, SILVIA, ZSA ZSU, MERR, DIVCHK, and DVCKON.

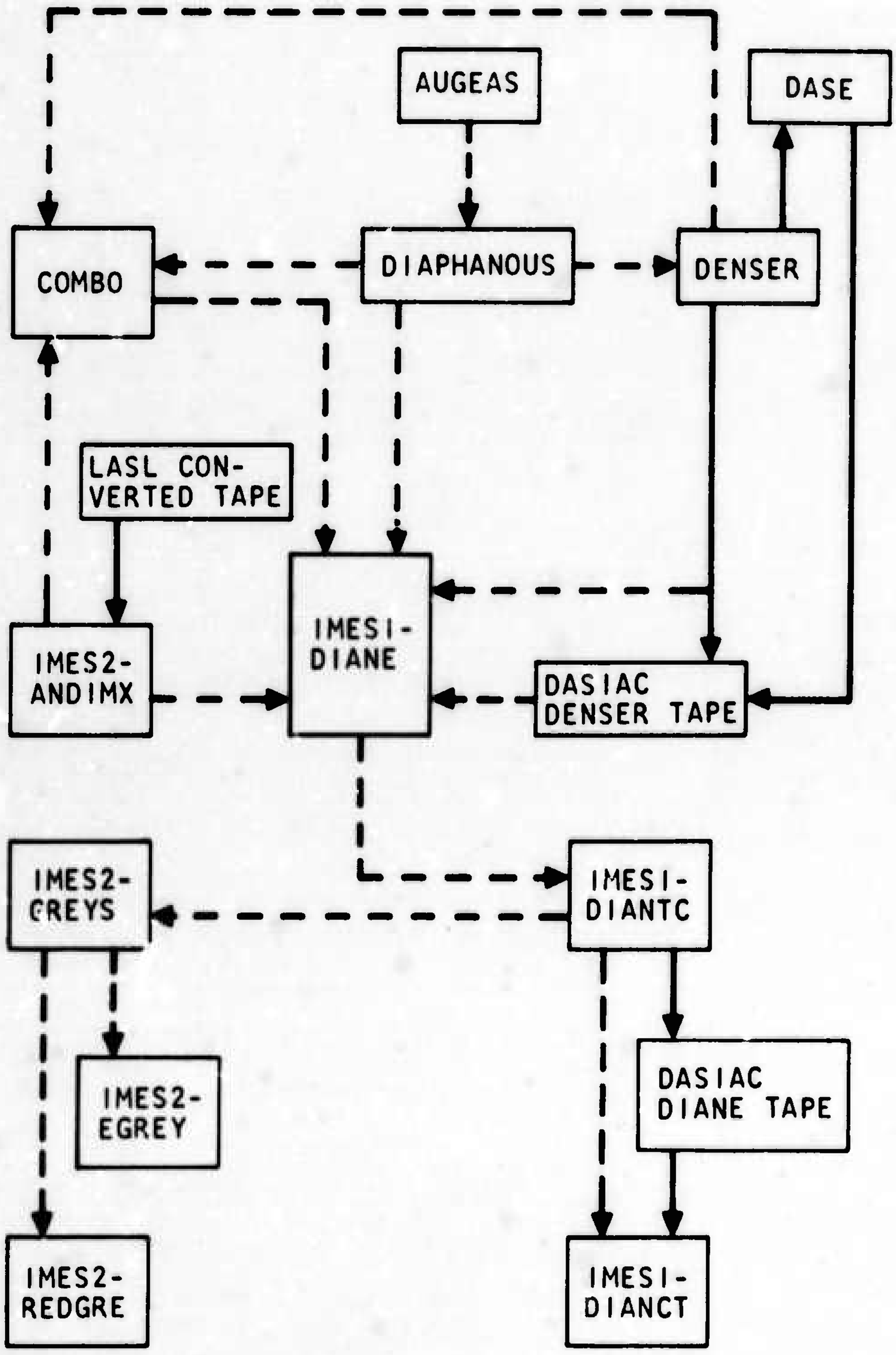

Figure 2. Opacity Programs General Flow

Now, SILVIA, ZSAZSU, MERR, DIVCHK, ALUETO, and DVCKON are dummy subroutines; MERR, DIVCHK, and DVCKON are system subroutines for the UNIVAC 1108, which may be dummied on the 6600.

Further information on DIANE may be found in the comments at the beginning of the listing. A flow summary is given in figure 3.

INPUT TO IMESI is two cards containing the following information:

CARD	COLUMNS	FORMAT	VAR. NAME	MEANING
1	1-72	12A6	ID(12)	72 columns of Hollerith title information
2	1	I1	IBINO	Used to indicate tape identification type for DINNEW, DIANCT, DIANTC, EDIANE runs. 0 if binary ID 1 if BCD ID If > 1, used by DIANTC or DIANCT to determine output tape unit for writing a BCD-formatted DIANE tape
2	2	I1	IRUN	Determines run type: *0 if "normal" run; IBINO is set to zero and routines DIANE (0, IBCDO), DINNEW (0), EDIANE (10, 0), and DIANTC (10, 0) are called 1 for all other runs

*To obtain a usable "new format" (Grey absorption coefficients first), DIANE tape, and punched output data cards, set IRUN to zero. The DIANE subprogram produces an "intermediate format" (Grey coefficients last) data tape; the DINNEW subprogram produces a "new format" DIANE tape; the EDIANE subprogram edits the "new format" tape; the DIANTC subprogram punches output cards from the "new format" tape.

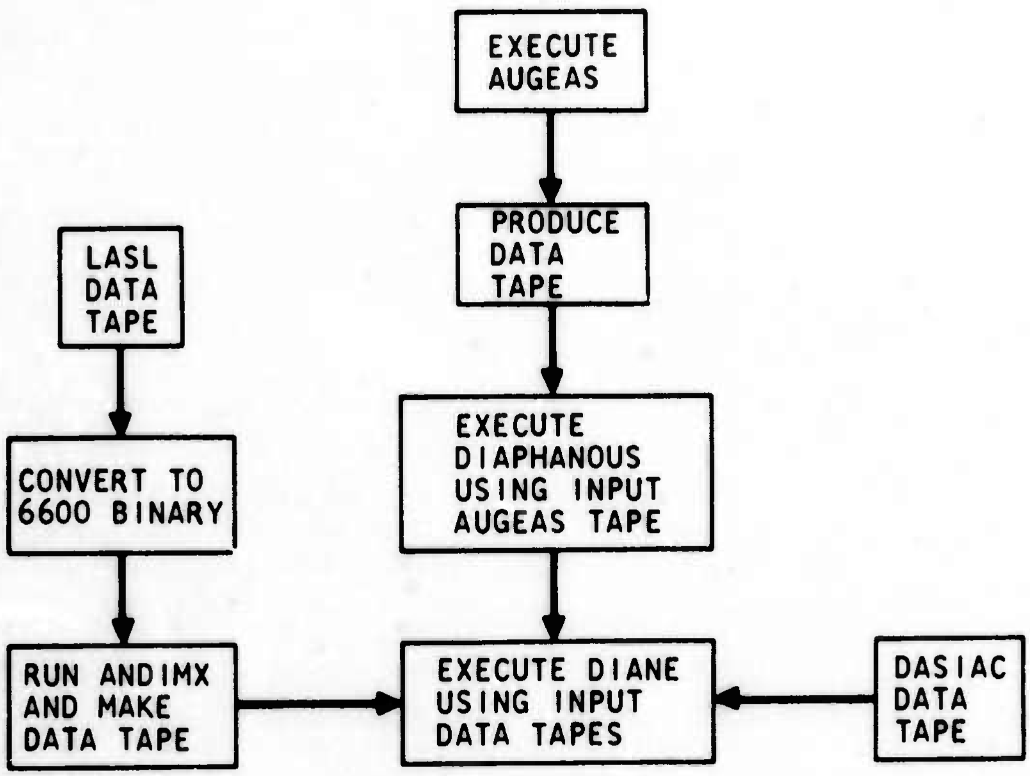

Figure 3. Procedure for Creating a DIANE Tape

CARD	COLUMNS	FORMAT	VAR. NAME	MEANING
2	3-23	20A1	IPATH(J)	Array used to determine subroutines (and order of subroutines) called: D DIANE (SCAT, IBCD0) W DINNEW (IBIN0) E EDIANE (TAPE 10, IBIN0) C DIANTC (Tape 10, IBIN0) T DIANCT (Tape 10, IBIN0) Y DYPDIN P EDIANE (Tape 11, IBIN0) Q DIANTC (Tape 11, IBIN0) R DIANCT (Tape 11, IBIN0) N DOLDIN (IBIN0) O ALUETO A SILVIA U ZSAZSU Z calls EXIT
2	25	I1	SCAT	Used to indicate scattering limit in DIANE: 0 if limit of 0.2 1 if limit of 1.E-10 2 if limit of 0.3977
2	26	I1	IBCD0	Used to indicate type of input DIAPHANOUS tape used by DIANE: 0 if compressed BCD input tape 1 if noncompressed binary input tape

REFERENCES CODES

Throughout this volume numerous references are made to writeups of the codes shown below. The writeups can be found in reports listed by each code.

CODE	REFERENCE
1. DIAPHANOUS	a. Stewart, J. C., and K. D. Pyatt, Jr., "A Theoretical Study of Optical Properties," Air Force Special Weapons Center Report AFSWC-TR-61-71, v. I, September 1961.
	b. Walsh, R. T., "DIAPHANOUS II," General Dynamics, General Atomic Division Informal Report GAMD-5549, 1964 (AD 453-351L)
2. DIANE	a. Lindley, W. B., "DIANE-A Computer Program to Provide Multi-Frequency Absorption Coefficients by Local Rosseland Averaging," General Dynamics, General Atomic Division Informal Report GAMD-5501, July 1964.
	b. Freeman, B. E., and C. G. Davis, "Fireball Phenomenology and Code Development," v. V, "Material Properties," Air Force Weapons Laboratory Report AFWL-TR-65-143, August 1965.
3. ZSAZSA	a. Lindley, W. B., "ZSAZSA-A Data Processor for Low-Temperature Air Absorption Coefficients," General Dynamics, General Atomic Division Informal Report GAMD-5496, July 1964.
	b. Freeman, B. E., and C. G. Davis, "Fireball Phenomenology and Code Development," v. V, "Material Properties," Air Force Weapons Laboratory Report AFWL-TR-65-143, August 1965.
4. SYLVIA	Smith, P. R., W. G. Vulliet, and W. B. Lindley, "Predictions of Thermal Damage in Nuclear Fireballs," v. II, "Material Properties," Air Force Flight Dynamics Laboratory Report AFFDL TR-66-45, February 1966.
5. EIONX CMOL	Pyatt, K. D., "Nuclear Explosion Interaction Studies," v. II, "Methods of Analysis of Thermal Phenomena," Air Force Weapons Laboratory Report AFWL-TR-66-108, May 1967.

CODE	REFERENCE
6. SPUTTER	a. "Optical Interactions. The SPUTTER Program," RTD TDR-63-3128, v. 2, General Dynamics, General Atomic Division, 1964. (AD 440-287).
	b. Pyatt, K. D., "Nuclear Explosion Interaction Studies," v. II, Methods of Analysis of Thermal Phenomena," Air Force Weapons Laboratory Report AFWL-TR-66-108, May 1967.

Applications of codes listed herein are given in reference 1. The contract that generated reference 1 runs concurrent with the contract for which this report is supplied; the contract for this report specifies that codes will be developed. The codes developed were supported by both of these contracts plus others.

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APPENDIX IV

EQUATION-OF-STATE INVERSION TECHNIQUES-MODIFICATION TO THE GEST AND LIBEX PROGRAMS

Introduction

GEST is a Fortran IV computer program which generates equation-of-state tables. These tables are designed to be used in other programs which require thermodynamic quantities (e.g., pressure (P) and temperature (θ)) as functions of the internal energy (E) and specific volume (τ). For each material of interest GEST requires an equation-of-state subroutine, EIONX, which uses temperature and specific volume as the two independent thermodynamic variables. The program then is essentially an inversion calculation, starting, for example, with the functions $P = P(\theta,\tau)$ and $E = E(\theta,\tau)$, and producing the tabular quantities $P_{ij} = P(E_i,\tau_j)$ and $\theta_{ij} = \theta(E_i,\tau_j)$ by an iterative process, for the given set of points E_i and τ_j.

LIBEX is a subprogram which provides the calling program with pressure, temperature, and other thermodynamic quantities as functions of E and τ. It is basically a table lookup program, using the output of GEST for the tabular data.

The GEST and LIBEX programs have been revised to make available a more flexible equation-of-state system in E-τ space. Basically, the method of calculation remains the same as that described in a previous report.* The changes have concentrated on two major areas: increasing the variety of thermodynamic variables available as data tables for the calculation of temperature and pressure; and providing a section specifically for equations of state which are applicable in both the molecular and atomic regimes. (The present version is limited to two-element compounds, but can easily be extended to compounds of an arbitrary number of elements.)

Revisions to the GEST Program

1. Choice of tabulated quantities

The table entries calculated in GEST are no longer limited to $\bar{Z}$, the mean number of free electrons per atom, and $\ln I$, where I is the

*Reed, L. L., "Equation of State Inversion from Temperature-Density to Specific Energy-Density by Table Look-up", GAMD-7189-Rev., July 1966.

internal energy due to ionization and excitation. The user now has a choice of six variables: $\bar{Z}$; $\ln I$; $\bar{N}$, the mean number of atoms per molecule; $\ln D$, where D is the dissociation energy; $\bar{Z}_1$, the mean ionic charge of the first element of a compound; $\bar{Z}_2$, the mean ionic charge of the second element. Any or all of these variables may be selected by setting the appropriate flags (see Input section).

2. Extension to Molecular Regime

For a single-element material consisting of atoms, ions, and free electrons it has been found convenient to tabulate the quantities $\bar{Z}$, the mean number of free electrons per atom, and $\ln I$, the logarithm of the ionization energy for a given set of points in E-τ space. By analogy, equations of state have been extended to the molecular regime simply by tabulating two additional quantities: $\bar{N}$, the mean number of atoms per molecule, and D, the dissociation energy. These two quantities are computed in a "molecular" subroutine written expressly for the desired material. Currently available subroutines are:

Name	Material
ES1IMS	Polyethylene
CMOL	Carbon
MESA	Air
ASTER	Polyethylene (improved)

The "molecular" subroutine is called by the EIONX subroutine, which acts as the master routine.

Molecular dissociation normally occurs at lower internal energies than does ionization, so that the range of internal energies for which $\bar{N}$ and D are changing is different from the range in which $\bar{Z}$ and I are changing. Consequently it was found desirable to tabulate $\bar{N}$ and D for one set of energy points (the E set) and to tabulate $\bar{Z}$ and $\ln I$ for a second set of energy points (the E' set). The two sets are related by

$$E = E' + D.$$

The reason for using two energy scales is the following: (1) The energy points are equally spaced on a logarithmic scale; (2) $\bar{Z}$ and I go to zero

as E' goes to zero; (3) thus for small values of E' (compared to D) one would get poorly resolved tables of $\bar{Z}$ and ℓn I if they were tabulated as functions of the total internal energy E. To give a numerical example, polyethylene has a total dissociation energy of 8.2×10^{11} erg/g. Using the GEST-generated data given in the listing of LIBEX at the end of this report, one finds that, at a specific volume of 10^5 cm^3/g, $\bar{Z}$ varies with E' as follows:

$\log_{10}$ E'	$\bar{Z}$
11.2125	$< 10^{-3}$
11.3792	9.4×10^{-3}
11.5459	3.66×10^{-2}
11.7125	8.45×10^{-2}

Note that there are four entries for $\bar{Z}$ varying between ~ 0 and 8.45×10^{-2}. In this energy range, and at this particular specific volume, the polyethylene is fully dissociated, or close to it, so that E $\simeq$ E' + 8.2×10^{11} erg/g. If we evaluate log E at the four points we get

$\log_{10}$ E'	$\log_{10}$ E
11.2125	11.968
11.3792	12.017
11.5459	12.076
11.7125	12.134

The difference between the maximum and minimum values of log E' is 0.50; the corresponding difference for E is 0.166. Thus, the tabulated $\bar{Z}$ variation would be covered by only two points on the log E scale, as compared to four points on the log E' scale.

3. Selection of minimum energy

The criterion for choosing θ_o for the purpose of calculating a minimum E or E' has been changed since the previous report. θ_o is now selected so that $\bar{N}(\theta_o, \tau_{max})$ must be greater than or equal to EN, an estimate of the maximum value of $\bar{N}$, and $\bar{Z}(\theta_o, \tau_{max})$ must be less than or equal to EB, the minimum $\bar{Z}$. For purely atomic materials, $\bar{N}$ is always unity and the input number EN should be set to 1.

4. Restart procedure

To deal with the more time-consuming equations of state, a data dump has been added to GEST. For each energy point and all its corresponding values of τ, the temperature and the quantities selected for the data tables are written out on tape 10. Also, an edit is printed giving the number of the energy point, MS for E or LS for E', and the quantities which have been saved on the tape. The problem can then be restarted from any energy point by specifying in input the current value of MS or LS. If restarting from an E' point, MS must be set to its maximum.

The final dump tape has several uses. By setting both MS and LS (if E' is being used) to their maximum, the tape can be used to repunch the data deck or make a final data tape using NTRAN. This tape can also be used to increase the number of decades of E and E'. The following table gives a diagram of how to set the input variables to accomplish this procedure.

To increase decades of:	MS	LS	NDUMP	DM	DL
E (not using E')	max.	0.	-1	increased no. decades	0.
E (using E')	max.	0.	-1	increased no. decades	no. decades
E'	max.	max.	-1	no. decades	increased no. decades
E and E'	max.	max.	-1	increased no. decades	increased no. decades

5. Iteration Criterion

Because any irregularity in the variation of E with θ makes iteration difficult, a new procedure has been added to GEST. If after 20 iterations the relative error between the E calculated by GEST and the desired E is greater than .5% but less than 15%, the code will use the values calculated at the energy closest to the desired E point to make up the tables. This same procedure is used for the E' points.

6. Input for GEST

Cards 2 and 6 have an integer field width of 5 and cards 3, 4, and 5 have a floating point field width of 10.

Card	Cols.	Mnemonics	Information
1			Header card-any BCD information. Will be reproduced as first line of output.
2	1-5	MS	No. of E point to be picked up on a tape restart. At start of calculation, MS must be 0.
	6-10	LS	No. of E' point to be picked up on a tape restart. Must be 0 until all E points have been calculated.
	11-15	NOPNCH	Set to 1 if punched data deck is desired, otherwise 0.
	16-20	NDUMP	0 - no dump on tape 10. 1 - pick up existing dump tape. -1 - start of problem and want to dump on tape 10 (tape 10 must be assigned). Picking up an existing dump tape to increase the number of decades of E or E'.
	21-25	ND11	Set to 1 if a data tape made using NTRAN is desired for LIBEX.
	26-30	NED	Set to 1 if table of ℓn D is desired, otherwise 0 or blank.
	31-35	NEI	Set to 1 if table of ℓn I is desired, otherwise 0 or blank.
	36-40	NNB	Set to 1 if $\bar{N}$ table is desired, otherwise 0 or blank.
	41-45	NZB	Set to 1 if $\bar{Z}$ table is desired, otherwise 0 or blank.
	46-50	NZB1	Set to 1 if $\bar{Z}_1$ table is desired, otherwise 0 or blank.
	51-55	NZB2	Set to 1 if $\bar{Z}_2$ table is desired, otherwise 0 or blank.

Card	Cols.	Mnemonics	Information
3	1-10	Z	Atomic no. of material
	11-20	A	Atomic mass no.
	21-30	V1	First ionization potential.
	31-40	VZ	Last ionization potential.
	41-50	R	No. of points per decade of E'.
	51-60	S	No. of points per decade of τ.
	61-70	T	No. of points per decade of E.
4	1-10	DN	No. of decades of τ.
	11-20	DM	No. of decades of E.
	21-30	DL	No. of decades of E'
	31-40	TAUZ	Minimum value of τ.
	41-50	EZ	Minimum value of E. If 0, the code will choose a minimum value.
	51-60	EPRZ	Minimum value of E'. If 0 the code will choose a minimum value.
	61-70	EN	Estimate of the maximum value of $\bar{N}$. Used to compute the minimum values of E and E'.
5	1-10	EB	Choice of minimum $\bar{Z}$. Sets ZBRMIN in EIONX. Used to compute the minimum value of E and E'.
	11-20	E14	Sets EION(14) before the call to EIONX. If 1, calls the molecular equation of state. Should be 0 otherwise.
	21-30	WT1	Percent of first element in the compound.
	31-40	WT2	Percent of second element in the compound.
	41-50	PAN1	Atomic number of first element of the compound.
	51-60	PAN2	Atomic number of second element of the compound.
6	1-5	IS	1 - uses EIONX for equation of state. Generally for nonmolecular equations of state. All E' quantities should be set to 0. 2 - Uses EIONX for equation of state. Particularly for equation of state where the molecular regime is of interest. All E' variables should be set.

Card	Cols.	Mnemonics	Information
6	6-45	I1 - I8	Table region flags. If a region of the table has been entered which has no tabulated values and the flag of that region has been set to zero, a calculation will proceed using the available analytic equations. At present regions 1, 7, and 8 have analytic equations or data. (see GAMD-7189 for a fuller discussion.)

Sample Data Cards

1) EXAMPLE OF CH2 DATA

2)

5	10	15	20	25	30	35	40	45	50	55
19	14	0	1	1	1	1	1	1	0	0

Pick up the 14th value of E' from tape 10 and continue the calculation.

Do not punch a data deck.

Make a final data tape using NTRAN (tape 11 must be assigned.)

Make up tables of the following quantities: $\ln$ D, $\ln$ I, $\bar{N}$, $\bar{Z}$.

3)

10	20	30	40	50	60	70
101.	4.6667	11.256	489.84	6.	3.	6.

Atomic number of CH2, atomic mass number, first and last ionization potentials.

6 points/decade of E'

3 points/decade of τ

6 points/decade of E

4)

10	20	30	40	50	60	70
9.	3.	3.	1.	0.	0.	4.

9 decades τ

3 decades E

3 decades E'

Minimum value of τ is 1.0 cm^3/g.

Zeros indicate that the code is to choose a minimum E and E'. Estimate of maximum $\bar{N}$ is 4.

5)

10	20	30	40	50	60	70
1.0 -03	1.0	0.0	0.0	0.0	0.0	0.0

Minimum $\bar{Z}$

EION(14) is set before each call to EIONX to call the molecular equation of state. Since the partial $\bar{Z}$'s are not being calculated, the quantities WT1, WT2, PAN1, PAN2 are unnecessary.

6)

2	0	1	1	1	1	1	0	0

Uses section of GEST for molecular equation of state.

The zeros indicate that the code is to use the analytic solutions provided in sections 1, 7, and 8.

6. Output

The GEST program has three forms of output: punched cards, a data tape, and printed tables.

The data tape is a new feature in GEST. The systems subroutine NTRAN is used to write out on tape 11 that portion of the data block containing all the variables necessary for LIBEX. This tape must be read in by NTRAN and a series of equivalences for the data variables must be set up with unused arrays in the calling program. This procedure has been developed especially for HECTIC as a space-saving device, but other programs could easily be adapted to use it.

The punched cards are in the form of data statements and are ready for immediate placement into LIBEX. However, for use on the 1108 all the data statements must be reproduced, placing an "E" in the data, e.g., 1.46E+10.

The printed output in the form of data tables can be used to check the punched data statements. Also a table of the θ's corresponding to each (E,τ) and (E',τ) point is printed so that the temperature range can be checked.

Revisions to the LIBEX Program

The revisions to the LIBEX program follow the same general scheme as those in GEST. The method of calculation remains the same as that described in GAMD-7189. The major changes have been made to deal with the increased number of thermodynamic variables and the E' energy term.

The flags, set in the GEST input to determine the series of tables, are transmitted to LIBEX in the data statements to determine which quantities are to be used to calculate Θ and P.

The value of IS is also transmitted to LIBEX. If IS was set equal to 2 in GEST, the variables $\bar{Z}$, $\bar{Z}_1$, $\bar{Z}_2$, and $\ln$ I are calculated from the data tables as a function E' and τ. Otherwise all the variables are calculated as a function of E and τ. The E' term is calculated in LIBEX by subtracting the dissociation energy, previously calculated from the tables as a function of E and τ, from E. The equations for the calculation of Θ and P have also been adapted for the molecular equation of state:

$$\Theta = (E - \phi I - D)/[1.5\ \phi(1./\bar{N} + \bar{Z})]$$
$$P = \phi(1./\bar{N} + \bar{Z})\Theta/\tau$$

A new function subroutine, EIONIZ, is now being used with LIBEX. This subroutine calculates the ionization energy given $\bar{Z}$ and the atomic number. This subroutine is used when tables of $\bar{Z}$ and $\bar{Z}_1$, or $\bar{Z}_1$ and $\bar{Z}_2$, or $\bar{Z}$ and $\bar{Z}_2$ are needed, to eliminate the need for an extra table containing the ionization energy.

If a region outside the limits of the table has been entered and no analytic solution is available, an S1 flag will be set and control returned to the calling program. Thus the subroutine ERR, or a comparable error routine should always be used with LIBEX.

GEST Mnemonics

Mnemonic	Definition
A	*
AIN	!
ALGE	!
ALGEPR	Log_{10} E'
ALGT	!
ALIN	!
D	Dissociation energy
DLGE	!
DLGEPR	Log_{10} E'/E'_o
DLGT	!
DLLEPR	$\Delta E'$ above position K in the table.
DMLE	!
DNLT	!
DP	Dissociation energy
E	!
E'	Specific internal energy-dissociation energy
EB	*
EDIS	ℓn D
EDLN	Array of ℓn D used in LIBEX
EDLNID	Array of ℓn D used in GEST
EILN	Array of ℓn I used in LIBEX
EILNID	!
EL	!
EM	!
EMAX	!
EMIN	!
EN	*
EPR	E'
EPRIME	Current value of EPR
EPRL	Log_{10} E'

! - see GAMD-7180-Rev.
* - see input for GEST, pp. 5-7.

Mnemonic	Definition
EPRM	Maximum value of E' in table
EPRZ	*
EZ	*
E14	*
GAND	Current value of E
I	!
IS	*
I1-I8	*
K	Index for table entries (K=(M-1)NN+N)
LL	Total number of E' points
LS	*
MM	Total number of E points
MS	*
NB	$\bar{N}$ array used in LIBEX
NBAR	Number of atoms per molecule
NBID	$\bar{N}$ array used in GEST
NBMAX	Maximum $\bar{N}$
NDUMP	*
NED	*
NEI	*
NN	Total number of τ points
NOPNCH	*
NZB	*
NZB1	*
NZB2	*
P	Pressure
PAN1	*
PAN2	*
PHI	!
STORTM	Stores closest value of Θ below that desired
STORTX	Stores closest value of Θ above that desired
T	!
τ	!
TAUL	!

Mnemonic	Definition
TAUM	!
TAUZ	!
TH	Array of temperature in ev for E' points
THETA	!
THMAX	!
THMIN	!
TH1MAX	Θ_{max} used in interpolation, E' points
TH1MIN	Θ_{min} used in interpolation, E' points
V1	*
VZ	*
WT1	*
WT2	*
Z	*
ZB	$\bar{Z}$ array used in LIBEX
ZBAR	!
ZBAR1	Mean ionic charge for first element of a compound
ZBAR2	Mean ionic charge of second element
ZB1	Array of $\bar{Z}_1$ used in LIBEX
ZB2	Array of $\bar{Z}_2$ used in LIBEX
ZB1D	Array of $\bar{Z}$ in GEST
ZB11D	Array of $\bar{Z}_1$ in GEST
ZB21D	Array of $\bar{Z}_2$ in GEST
ZPART	Stores values of $\bar{Z}_1$ and $\bar{Z}_2$ in LIBEX

```
C     GENERATE EQUATION OF STATE TABLES
C
      DIMENSION    THETA(50,50),CARD(14),TH(50,50)
      DIMENSION TAU(50),TAUL(50),E(50),EL(50),EPR(50),EPRL(50)
      DIMENSION IT(1),NED(1),NEI(1),NNB(1),NZB(1),NZB1(1),NZB2(1),TAUM(1
     1),EM(1),EPRM(1),TAUZ(1),EZ(1),EPRZ(1),TAULZ(1),ELZ(1),EPRLZ(1),R(1
     2),S(1),T(1),V1(1),VZ(1),FHI(1),NBMAX(1),NX(1),MX(1),LZ(1),I1(1),I2
     3(1),I3(1),I4(1),I5(1),I61(1),I7(1),I8(1),WT1(1),WT2(1),PAN1(1),
     4 PAN2(1)
      DIMENSION ZB1D(1594),EILN1D(1594),NB1D(1594),EDLN1D(1594),ZB11D(15
     193),ZB21D(1593)
      EQUIVALENCE  (EB,ZBRMIN), (ZBRMIN(1),EIONIN(29))
      EQUIVALENCE (EION(5),PHI), (EION(8),GAND), (EPRIME,EION(15))
      EQUIVALENCE (TLMSB(14),DIS),(EION(17),NBAR)
      COMMON/LMSC/M1(51)
      EQUIVALENCE (ZBAR1,M1(5)),(ZBAR2,M1(15))
      COMMON/LMSG/CARBNZ(10)
      COMMON/LMSD/        TLMS(16)
      COMMON/LMSESN/TLMSB(15)
      COMMON/EOSIN/EIONIN(30)
      DIMENSION ZBRMIN(1)
      COMMON/LMS/ EION(20)
      EQUIVALENCE (ZBAR, EION(3)), (PHI,EION(5))
      REAL NB1D
      REAL NBAR
      REAL NBMAX
      EXPT(Q)=EXP(2.3026*Q)
      READ (5,1860) (CARD(I),I=1,12)
      WRITE (6,1860) (CARD(I),I=1,12)
C        READ AND STORE INPUT
      READ (5,1850) MS,LS,NOPNCH,NDUMP,ND11,NED,NEI,NNB,NZB,NZB1,NZB2
      WRITE (6,1850) MS,LS,NOPNCH,NDUMP,ND11,NED,NEI,NNB,NZB,NZB1,NZB2
      READ (5,1840) Z,A,V1,VZ,R,S,T,DN,DM,DL,TAUZ,EZ,EPRZ,EN,EB,E14,
     1 WT1,WT2,PAN1,PAN2
      WRITE (6,2380) Z,A,V1,VZ,R,S,T,DN,DM,DL,TAUZ,EZ,EPRZ,EN,EB,E14,
     1 WT1,WT2,PAN1,PAN2
      READ (5,1850) IS,I1,I2,I3,I4,I5,I6,I7,I8
      WRITE (6,1850) IS,I1,I2,I3,I4,I5,I6,I7,I8
      IF (NNB.NE.1) NBAR=1.0
      IF (NDUMP) 50,50,10
   10 J=Z
C     READ DUMP TAPE
      READ (10) TAUM,EM,EPRM,TAUZ,EZ,EPRZ,TAUL(1),EL(1),EPRL(1),PHI,NN,M
     1M,LL
      READ (10) (TAU(N),N=1,NN)
      READ (10) (E(M),M=1,MM)
      IF (IS.EQ.2) READ (10) (EPR(L),L=1,LL)
      DO 20 M=1,MS
      READ (10) (THETA(N,M),N=1,NN)
      KMN=(M-1)*NN+1
      KMX=KMN+NN-1
      IF (NED.EQ.1) READ (10) (EDLN1D(K),K=KMN,KMX)
      IF (NNB.EQ.1) READ (10) (NB1D(K),K=KMN,KMX)
      IF (IS.EQ.2) GO TO 20
      IF (NEI.EQ.1) READ (10) (EILN1D(K),K=KMN,KMX)
      IF (NZB.EQ.1) READ (10) (ZB1D(K),K=KMN,KMX)
      IF (NZB1.EQ.1) READ (10) (ZB11D(K),K=KMN,KMX)
      IF (NZB2.EQ.1) READ (10) (ZB21D(K),K=KMN,KMX)
```

```
   20 CONTINUE                                                          EST  550
      IF (IS.NE.2.OR.LS.EQ.0.) GO TO 40                                 EST  560
      DO 30 L=1,LS                                                      EST  570
      READ (10) (TH(N,L),N=1,NN)                                        EST  580
      KMN=(L-1)*NN+1                                                    EST  590
      KMX=KMN+NN-1                                                      EST  600
      IF (NEI.EQ.1) READ (10) (EILN1D(K),K=KMN,KMX)                     EST  610
      IF (NZB.EQ.1) READ (10) (ZB1D(K),K=KMN,KMX)                       EST  620
      IF (NZB1.EQ.1) READ (10) (ZB11D(K),K=KMN,KMX)                     EST  630
      IF (NZB2.EQ.1) READ (10) (ZB21D(K),K=KMN,KMX)                     EST  640
   30 CONTINUE                                                          EST  650
   40 CONTINUE                                                          EST  660
      GO TO 160                                                         EST  670
C     MS = E POINT FOR TAPE RESTART
C     LS = EPRIME POINT FOR TAPE RESTART
C     NOPNCH = 1  -  PUNCH A DATA DECK
C     NDUMP = 0 - NO DUMP ON TAPE 10
C           = 1  -  PICKUP TAPE 10
C           = -1  -  START PROBLEM AND DUMP OF TAPE 10
C     ND11 = 1  -  MAKE AN NTRAN TAPE
C     NED = FLAG FOR EDIS TABLE
C     NEI = FLAG FOR EION TABLE
C     NNB = FLAG FOR NBAR TABLE
C     NZB = FLAG FOR ZBAR TABLE
C     NZB1 = FLAG FOR ZBAR1 TABLE
C     NZB2 = FLAG FOR ZBAR2 TABLE
C        Z = ATOMIC CHARGE NO.                                          EST  680
C        A = ATOMIC MASS NO.                                            EST  690
C       V1 = FIRST IONIZATION POTENTIAL                                 EST  700
C       VZ = LAST IONIZATION POTENTIAL                                  EST  710
C     R = NUMBER OF TABULAR POINTS/DECADE OF EPRIME
C        S = NO. OF TABULAR PTS/DECADE OF TAU                           EST  720
C        T = NO. OF TABULAR PTS/DECADE OF E                             EST  730
C       DN = NO. OF DECADES OF TAU                                      EST  740
C       DM = NO OF DECADES OF E                                         EST  750
C     DL = NUMBER OF DECADES OF EPRIME
C     TAUZ = MIN VALUE OF TAU IN TABLE                                  EST  760
C       EZ = MIN VALUE OF  E  IN TABLE                                  EST  770
C     EPRZ = MINIMUM VALUE OF EPRIME IN TABLE
C     EN = ESTIMATE OF MAX NBAR
C     EB = MIN ZBAR
C     E14 = 1. -  SETS EION(1J) BEFORE CALL TO EIONX
C                 TO CALL MOLECULAT EQUATION OF STATE
C     WT1 = PERCENT OF FIRST ELEMENT IN A COMPOUND
C     WT2 = PERCENT OF SECOND ELEMENT IN A COMPOUND
C     PAN1 = ATOMIC NUMBER OF FIRST ELEMENT IN A COMPOUND
C     PAN2 = ATOMIC NUMBER OF SECOND ELEMENT IN A COMPOUND
C     IS = SECTION USED TO GENERATE TABLE
C        = 1  -  FOR NON-MOLECULAR EQUATIONS OF STATE
C        = 2  -  FOR MOLECULAR EQUATIONS OF STATE
C       I1 THRU I8 FLAGS INDICATING TREATMENT AT BOUNDARIES OF TABLE    EST  800
C       IN = 1 STOP IF REGION IS ENTERED                                EST  810
C          = 0 CALCULATE WITH AVAILABLE ANALYTIC EQS                    EST  820
C        3 * 4 * 5                                                      EST  830
C        *********                                                      EST  840
C          *   *                                                        EST  850
C      E 2 *   * 6                                                      EST  860
```

```
C          *   *
C        *********
C        1 * 8 * 7
C           TAU
   50 J=Z
      PHI=9.648679E11/A
      AM=T*DM+1.0
      AN=S*DN+1.0
      AL=R*DL+1.0
      NN=AN
      MM=AM
      LL=AL
      TAUM=TAUZ*10.0**DN
      TAUL(1)=ALOG10(TAUZ)
      DTAUL=1./S
      TAU(1)=TAUZ
      IF (EZ.NE.0.) GO TO 90
      THA=1.1
      DO 60 I=1,10
      THA=THA-.1
      EION(14)=E14
      CALL EIONX (THA,TAUM,J,0.)
      S1=EION(14)
      IF (S1.NE.0.) CALL ERR (S1)
      IF ((EION(17).LT.EN).OR.(EION(3).GT.EB)) GO TO 60
      EZ=EION(8)
      GO TO 70
   60 CONTINUE
      S1=10.20
      CALL ERR (S1)
   70 IF (EPRZ.NE.0.0.OR.IS.NE.2) GO TO 90
      THA=1.1
      DO 80 I=1,10
      THA=THA-.1
      EION(14)=E14
      CALL EIONX (THA,TAUM,J,0.)
      S1=EION(14)
      IF (S1.NE.0.) CALL ERR (S1)
      IF ((EION(17).LT.EN).OR.(EION(3).GT.EB)) GO TO 80
      EPRZ=EPRIME
      GO TO 90
   80 CONTINUE
      S1=10.46
      CALL ERR (S1)
   90 CONTINUE
C     PREPARE TABLES OF SPECIFIC VOLUME AND ENERGY
C        IN REAL SPACE AND IN LOG BASE 10.
      DO 100 I=2,NN
      TAUL(I)=TAUL(I-1)+DTAUL
      TAU(I)=EXPT(TAUL(I))
  100 CONTINUE
      EM=EZ*10.0**DM
      EL(1)=ALOG10(EZ)
      DEL=1./T
      E(1)=EZ
      DO 110 I=2,MM
      EL(I)=EL(I-1)+DEL
```

```
      E(I)=EXPT(EL(I))
  110 CONTINUE
      IF (IS.EQ.2) GO TO 120
      EPRM=0.0
      EPRL(1)=0.0
      GO TO 140
  120 EPRM=EPRZ*10.0**DL
      EPRL(1)=ALOG10(EPRZ)
      EPR(1)=EPRZ
      DO 130 I=2,LL
      EPRL(I)=EPRL(I-1)+DEL
      EPR(I)=EXPT(EPRL(I))
  130 CONTINUE
      WRITE (6,2340)
      WRITE (6,2380) (EPRL(M),M=1,MM)
  140 WRITE (6,2350)
      WRITE (6,2380) (TAUL(N),N=1,NN)
      WRITE (6,2330)
      WRITE (6,2380) (EL(M1),M1=1,MM)
      IF (NDUMP.EQ.-1.AND.MS.NE.0) GO TO 160
      IF (NDUMP) 150,160,160
  150 WRITE (10) TAUM,EM,EPRM,TAUZ,EZ,EPRZ,TAUL(1),EL(1),EPRL(1),PHI,NN,
     1MM,LL
      WRITE (10) (TAU(N),N=1,NN)
      WRITE (10) (E(M),M=1,MM)
      IF (IS.EQ.2) WRITE (10) (EPR(L),L=1,LL)
C     DETERMINE SECTION USED TO CALCULATE DATA TABLES
  160 GO TO (170,390,800,810), IS
  170 CONTINUE
C
C     SINGLE ENERGY SCALE SECTION
C           (NO E-PRIME)
C
      IF (MS.EQ.MM) GO TO 820
      MS2=MS+1
      DO 380 M=MS2,MM
      DO 300 N=1,NN
      STORTM=1.0E-10
      STORTX=1.0E+10
      AX=0.
      AM=0.
      K=(M-1)*NN+N
C        INITIAL GUESS AT THE TEMPERATURE
      THMIN=THETA(N,M-1)
      THMAX=THETA(N-1,M)
      IF (N.EQ.1) THMAX=E(M)/PHI
      IF ((N.EQ.1).AND.(M.GT.1)) THMAX=3.*THETA(N,M-1)
      IF (M.EQ.1) THMIN=.2
      THETA(N,M)=THMIN
      DO 230 I=1,20
      EION(14)=E14
      CALL EIONX (THMIN,TAU(N),J,0.)
      S1=EION(14)
      IF (S1.NE.0.) CALL ERR (S1)
      EMIN=EION(8)
      EION(14)=E14
  180 CALL EIONX (THMAX,TAU(N),J,0.)
```

```
      S1=EION(14)                                                       EST 1970
      IF (S1.NE.0.) CALL ERR (S1)                                       EST 1980
      EMAX=EION(8)                                                      EST 1990
      GAMMA=3.*E(M)                                                     EST 2000
      IF (EMAX.LT.GAMMA) GO TO 190                                      EST 2010
      THMAX=THMAX*.9                                                    EST 2020
      GO TO 180                                                         EST 2030
  190 EION(14)=E14                                                      EST 2040
      CALL EIONX (THETA(N,M),TAU(N),J,0.)                               EST 2050
      WS=THETA(N,M)                                                     EST 2060
C        NEWTON'S INTERPOLATION                                         EST 2070
      THETA(N,M)=THETA(N,M)+(THMAX-THMIN)*(E(M)-EION(8))/(EMAX-EMIN)    EST 2080
      ZETA=ABS(EION(8)-E(M))/(E(M))                                     EST 2090
      IF (ZETA.LE..005) GO TO 290                                       EST 2100
      IF (ZETA.GT..15) GO TO 210                                        EST 2110
      IF (EION(8).GT.E(M)) GO TO 200                                    EST 2120
      STORTM=AMAX1(WS,STORTM)                                           EST 2130
      AM=1.                                                             EST 2140
      GO TO 210                                                         EST 2150
  200 STORTX=AMIN1(WS,STORTX)                                           EST 2160
      AX=1.                                                             EST 2170
  210 IF (EION(8).LT.E(M)) THMIN=THETA(N,M)                             EST 2180
      IF (EION(8).GT.E(M)) GO TO 220                                    EST 2190
      THMIN=THETA(N,M)                                                  EST 2200
      GO TO 230                                                         EST 2210
  220 THMAX=THETA(N,M)                                                  EST 2220
  230 CONTINUE                                                          EST 2230
      IF ((AX.EQ.1.).AND.(AM.EQ.1.)) GO TO 240                          EST 2240
      IF ((AX.EQ.1.).AND.(AM.EQ.0.)) GO TO 250                          EST 2250
      IF ((AX.EQ.0.).AND.(AM.EQ.1.)) GO TO 260                          EST 2260
      IF ((AX.EQ.0.).AND.(AM.EQ.0.)) GO TO 280                          EST 2270
  240 AVR=ABS((STORTX-STORTM)/2.)                                       EST 2280
      THETA(N,M)=STORTM+AVR                                             EST 2290
      GO TO 270                                                         EST 2300
  250 THETA(N,M)=STORTX                                                 EST 2310
      GO TO 270                                                         EST 2320
  260 THETA(N,M)=STORTM                                                 EST 2330
  270 EION(14)=E14                                                      EST 2340
      CALL EIONX (THETA(N,M),TAU(N),J,0.)                               EST 2350
      S1=EION(14)                                                       EST 2360
      IF (S1.NE.0.) CALL ERR (S1)                                       EST 2370
      GO TO 290                                                         EST 2380
  280 S1=10.120                                                         EST 2390
      CALL ERR (S1)                                                     EST 2400
  290 CONTINUE                                                          EST 2410
C     ALL VARIABLES DETERMINED FROM EIONX USING E                       EST 2420
      ZB1D(K)=EION(3)                                                   EST 2430
      NB1D(K)=EION(17)                                                  EST 2440
      NBMAX=NB1D(1)                                                     EST 2450
      ZB11D(K)=M1(5)                                                    EST 2460
      ZB21D(K)=M1(15)                                                   EST 2470
      AEI=(EION(8)-1.5*EION(1)*PHI*(1./NBAR+ZBAR))/PHI                  EST 2480
      IF (AEI.LE.1.E-10) AEI=1.E-10                                     EST 2490
      EILN1D(K)=ALOG(AEI)                                               EST 2500
      DP=CARBNZ(1)+DIS                                                  EST 2510
      IF (DP.LE.1.E-10) DP=1.E-10                                       EST 2520
      EDLN1D(K)=ALOG(DP)                                                EST 2530
```

```
C      END OF SPECIFIC VOLUME LOOP
  300 CONTINUE                                                          EST 2540
C      MAKE DUMP TAPE
       IF (NDUMP) 310,380,310                                           EST 2550
  310 MS=M                                                              EST 2560
       WRITE (10) (THETA(N,MS),N=1,NN)                                  EST 2570
       WRITE (6,2360)                                                   EST 2580
       WRITE (6,2380) (THETA(N,MS),N=1,NN)                              EST 2590
       KMN=(MS-1)*NN+1                                                  EST 2600
       KMX=KMN+NN-1                                                     EST 2610
       IF (NED.EQ.0) GO TO 320                                          EST 2620
       WRITE (10) (EDLN1D(K),K=KMN,KMX)                                 EST 2630
       WRITE (6,2270)                                                   EST 2640
       WRITE (6,2380) (EDLN1D(K),K=KMN,KMX)                             EST 2650
  320 IF (NEI.EQ.0) GO TO 330                                           EST 2660
       WRITE (10) (EILN1D(K),K=KMN,KMX)                                 EST 2670
       WRITE (6,2280)                                                   EST 2680
       WRITE (6,2380) (EILN1D(K),K=KMN,KMX)                             EST 2690
  330 IF (NNB.EQ.0) GO TO 340                                           EST 2700
       WRITE (10) (NB1D(K),K=KMN,KMX)                                   EST 2710
       WRITE (6,2290)                                                   EST 2720
       WRITE (6,2380) (NB1D(K),K=KMN,KMX)                               EST 2730
  340 IF (NZB.EQ.0) GO TO 350                                           EST 2740
       WRITE (10) (ZB1D(K),K=KMN,KMX)                                   EST 2750
       WRITE (6,2300)                                                   EST 2760
       WRITE (6,2380) (ZB1D(K),K=KMN,KMX)                               EST 2770
  350 IF (NZB1.EQ.0) GO TO 360                                          EST 2780
       WRITE (10) (ZB11D(K),K=KMN,KMX)                                  EST 2790
       WRITE (6,2310)                                                   EST 2800
       WRITE (6,2380) (ZB11D(K),K=KMN,KMX)                              EST 2810
  360 IF (NZB2.EQ.0) GO TO 370                                          EST 2820
       WRITE (10) (ZB11D(K),K=KMN,KMX)                                  EST 2830
       WRITE (6,2320)                                                   EST 2840
       WRITE (6,2380) (ZB21D(K),K=KMN,KMX)                              EST 2850
  370 WRITE (6,2390) MS                                                 EST 2860
C      END OF ENERGY LOOP
  380 CONTINUE                                                          EST 2870
       GO TO 820                                                        EST 2880
  390 CONTINUE                                                          EST 2890
C
C      THIS SECTION FOR MOLECULAR MATERIALS WHOSE DISSOCIATION ENERGY
C            IS CALCULATED.
C      TWO ENERGY SCALES ARE USED
C
       IF (MS.EQ.MM) GO TO 590                                          EST 2900
       MS2=MS+1                                                         EST 2910
       DO 580 M=MS2,MM                                                  EST 2920
       DO 540 N=1,NN                                                    EST 2930
       STORTM=1.0E-10                                                   EST 2940
       STORTX=1.0E+10                                                   EST 2950
       AX=0.                                                            EST 2960
       AM=0.                                                            EST 2970
       K=(M-1)*NN+N                                                     EST 2980
C        INITIAL GUESS AT THE TEMPERATURE                               EST 2990
       THMIN=THETA(N,M-1)                                               EST 3000
       THMAX=THETA(N-1,M)                                               EST 3010
       IF (N.EQ.1) THMAX=EION(17)*E(M)*2.0/(3.0*EION(5))                EST 3020
```

```
      IF ((N.EQ.1).AND.(M.GT.1)) THMAX=2.*THETA(N,M-1)
      IF (M.EQ.1) THMIN=3.0E-2
      THETA(N,M)=THMIN
      DO 470 I=1,20
      IF (I.EQ.1) THMIN1=THMIN
      EION(14)=E14
      CALL EIONX (THMIN,TAU(N),J,0.)
      S1=EION(14)
      IF (S1.NE.0.) CALL ERR (S1)
      EMIN=GAND
      IF (I.EQ.1) EMIN1=EMIN
  400 EION(14)=E14
      CALL EIONX (THMAX,TAU(N),J,0.)
      S1=EION(14)
      IF (S1.NE.0.) CALL ERR (S1)
      EMAX=GAND
      GAMMA=3.*E(M)
      IF (EMAX.LT.GAMMA) GO TO 410
      THMAX=THMAX*.9
      GO TO 400
  410 EION(14)=E14
      CALL EIONX (THETA(N,M),TAU(N),J,0.)
      WS=THETA(N,M)
C        NEWTON'S INTERPOLATION
  420 THETA(N,M)=WS+(THMAX-THMIN)*(E(M)-GAND)/(EMAX-EMIN)
      IF (THETA(N,M).GT.0.0) GO TO 430
      THMAX=WS
      THMIN=THMIN1
      EMAX=GAND
      EMIN=EMIN1
      GO TO 420
  430 ZETA=ABS((GAND-E(M))/E(M))
      IF (ZETA.LE..005) GO TO 530
      IF (ZETA.GT..15) GO TO 450
      IF (GAND.GT.E(M)) GO TO 440
      STORTM=AMAX1(WS,STORTM)
      AM=1.
      GO TO 450
  440 STORTX=AMIN1(WS,STORTX)
      AX=1.
  450 IF (GAND.GT.E(M)) GO TO 460
      IF ((WS+.01).GT.THETA(N,M)) THETA(N,M)=WS+.01
      THMIN=THETA(N,M)
      GO TO 470
  460 THMAX=THETA(N,M)
  470 CONTINUE
      IF ((AX.EQ.1.).AND.(AM.EQ.1.)) GO TO 480
      IF ((AX.EQ.1.).AND.(AM.EQ.0.)) GO TO 490
      IF ((AX.EQ.0.).AND.(AM.EQ.1.)) GO TO 500
      IF ((AX.EQ.0.).AND.(AM.EQ.0.)) GO TO 520
  480 AVR=ABS((STORTX-STORTM)/2.)
      THETA(N,M)=STORTM+AVR
      GO TO 510
  490 THETA(N,M)=STORTX
      GO TO 510
  500 THETA(N,M)=STORTM
      GO TO 510
```

```
 510 EION(14)=E14
     CALL EIONX (THETA(N,M),TAU(N),J,0.)
     S1=EION(14)
     IF (S1.NE.0.) CALL ERR (S1)
     GO TO 530
 520 S1=10.120
     CALL ERR (S1)
 530 CONTINUE
C     NBAR AND EDIS OBTAINED FROM EIONX USING E
     NB1D(K)=EION(17)
     NBMAX=NB1D(1)
     DP=CARBNZ(1)+DIS
     IF (DP.LE.1.E-10) DP=1.E-10
     EDLN1D(K)=ALOG(DP)
C    END OF SPECIFIC VOLUME LOOP
 540 CONTINUE
C    MAKE DUMP TAPE
     IF (NDUMP) 550,580,550
 550 MS=M
     WRITE (10) (THETA(N,MS),N=1,NN)
     WRITE (6,2360)
     WRITE (6,2380) (THETA(N,MS),N=1,NN)
     KMN=(MS-1)*NN+1
     KMX=KMN+NN-1
     IF (NED.EQ.0) GO TO 560
     WRITE (10) (EDLN1D(K),K=KMN,KMX)
     WRITE (6,2270)
     WRITE (6,2380) (EDLN1D(K),K=KMN,KMX)
 560 IF (NNB.EQ.0) GO TO 570
     WRITE (10) (NB1D(K),K=KMN,KMX)
     WRITE (6,2290)
     WRITE (6,2380) (NB1D(K),K=KMN,KMX)
 570 WRITE (6,2390) MS
C    END OF ENERGY LOOP
 580 CONTINUE
 590 IF (LS.EQ.LL) GO TO 820
     LS2=LS+1
     DO 790 L=LS2,LL
     DO 730 N=1,NN
     STORM1=1.0E-10
     STORX1=1.0E+10
     AX1=0.
     AM1=0.
     K=(L-1)*NN+N
C      INITIAL GUESS AT THE TEMPERATURE
     TH1MIN=TH(N,L-1)
     TH1MAX=TH(N-1,L)
     IF (N.EQ.1) TH1MAX=EION(17)*EPR(L)*2.0/(3.0*EION(5))
     IF ((N.EQ.1).AND.(L.GT.1)) TH1MAX=3.*TH(N,L-1)
     IF (L.EQ.1) TH1MIN=3.0E-2
     TH(N,L)=TH1MIN
     DO 660 I=1,20
     IF (I.EQ.1) THMIN2=TH1MIN
     EION(14)=E14
     CALL EIONX (TH1MIN,TAU(N),J,0.)
     S1=EION(14)
     IF (S1.NE.0.) CALL ERR (S1)
```

```
      EMIN=EPRIME
      IF (I.EQ.1) EMIN2=EMIN
  600 EION(14)=E14
      CALL EIONX (TH1MAX,TAU(N),J,0.)
      S1=EION(14)
      IF (S1.NE.0.) CALL ERR (S1)
      EMAX=EPRIME
      GAMMA=3.*EPR(M)
      IF (EMAX.LT.GAMMA) GO TO 610
      TH1MAX=TH1MAX*.9
      GO TO 600
  610 EION(14)=E14
      CALL EIONX (TH(N,L),TAU(N),J,0.)
      DP=CARBNZ(1)+DIS
      WS1=TH(N,L)
C       NEWTONS INTERPOLATION
  620 TH(N,L)=WS1+(TH1MAX-TH1MIN)*(EPR(L)-EPRIME)/(EMAX-EMIN)
      IF (TH(N,L).GT.0.0) GO TO 630
      TH1MAX=WS1
      TH1MIN=THMIN2
      EMAX=EPRIME
      EMIN=EMIN2
      GO TO 620
  630 ZETA1=ABS((EPRIME-EPR(L))/EPR(L))
      IF (ZETA1.LE..005) GO TO 720
      IF (ZETA1.GT..25) GO TO 650
      IF (EPRIME.GT.EPR(L)) GO TO 640
      STORM1=AMAX1(WS1,STORM1)
      AM1=1.
      GO TO 650
  640 STORX1=AMIN1(WS1,STORX1)
      AX1=1.
  650 IF (EPRIME.LT.EPR(L)) TH1MIN=TH(N,L)
      IF (EPRIME.GT.EPR(L)) TH1MAX=TH(N,L)
  660 CONTINUE
      IF ((AX1.EQ.1.).AND.(AM1.EQ.1.)) GO TO 670
      IF ((AX1.EQ.1.).AND.(AM1.EQ.0.)) GO TO 680
      IF ((AX1.EQ.0.).AND.(AM1.EQ.1.)) GO TO 690
      IF ((AX1.EQ.0.).AND.(AM1.EQ.0.)) GO TO 710
  670 AVR1=ABS((STORX1-STORM1)/2.)
      TH(N,M)=STORM1+AVR1
      GO TO 700
  680 TH(N,M)=STORX1
      GO TO 700
  690 TH(N,M)=STORM1
      GO TO 700
  700 EION(14)=E14
      CALL EIONX (TH(N,L),TAU(N),J,0.)
      DP=CARBNZ(1)+DIS
      S1=EION(14)
      IF (S1.NE.0.) CALL ERR (S1)
      GO TO 720
  710 S1=10.50
      CALL ERR (S1)
  720 CONTINUE
C       ZBAR AND EION OBTAINED FROM EIONX USING EPRIME
      ZB1D(K)=EION(3)
```

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      ZB11D(K)=M1(5)
      ZB21D(K)=M1(15)
      AEI=(GAND-DP-1.5*EION(1)*TLMS(9))/EION(5)
      IF (AEI.LE.1.E-10) AEI=1.E-10
      EILN1D(K)=ALOG(AEI)
C     END OF SPECIFIC VOLUME LOOP
  730 CONTINUE
C     MAKE DUMP TAPE
      IF (NDUMP) 740,790,740
  740 LS=L
      WRITE (10) (TH(N,LS),N=1,NN)
      WRITE (6,2360)
      WRITE (6,2380) (TH(N,LS),N=1,NN)
      KMN=(LS-1)*NN+1
      KMX=KMN+NN-1
      IF (NEI.EQ.0) GO TO 750
      WRITE (10) (EILN1D(K),K=KMN,KMX)
      WRITE (6,2280)
      WRITE (6,2380) (EILN1D(K),K=KMN,KMX)
  750 IF (NZB.EQ.0) GO TO 760
      WRITE (10) (ZB1D(K),K=KMN,KMX)
      WRITE (6,2300)
      WRITE (6,2380) (ZB1D(K),K=KMN,KMX)
  760 IF (NZB1.EQ.0) GO TO 770
      WRITE (10) (ZB11D(K),K=KMN,KMX)
      WRITE (6,2310)
      WRITE (6,2380) (ZB11D(K),K=KMN,KMX)
  770 IF (NZB2.EQ.0) GO TO 780
      WRITE (10) (ZB21D(K),K=KMN,KMX)
      WRITE (6,2320)
      WRITE (6,2380) (ZB21D(K),K=KMN,KMX)
  780 WRITE (6,2400) LS
C     END OF ENERGY LOOP
  790 CONTINUE
      GO TO 820
  800 CONTINUE
  810 CONTINUE
C
C         PUNCH DATA STATEMENTS FOR PROGRAM EST
  820 CONTINUE
      KM=NN*MM
      IF (NOPNCH.EQ.0) GO TO 1610
      ID=1
      PUNCH 2200
      PUNCH 1930, ID,IS,NED,NEI,NNB,NZB,NZB1,NZB2
      PUNCH 2160
      PUNCH 1940, ID,TAUM,EM,EPRM,TAUZ,EZ,EPRZ
      PUNCH 2170
      PUNCH 1940, ID,TAUL(1),EL(1),EPRL(1),R,S,T
      PUNCH 2180
      PUNCH 1950, ID,V1,VZ,PHI,NBMAX
      PUNCH 2410
      PUNCH 1950, ID,WT1,WT2,PAN1,PAN2
      PUNCH 2190
      PUNCH 1970, ID,NN,MM,LL,I1,I2,I3,I4,I5,I6,I7,I8
      IF (NNB.EQ.0) GO TO 830
      PUNCH 2040, NN,MM
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      PUNCH 2230                                                        EST 5230
  830 IF (NED.EQ.0) GO TO 840                                           EST 5240
      PUNCH 1980, NN,MM                                                 EST 5250
      PUNCH 2210                                                        EST 5260
  840 IF (IS.EQ.2) MM=LL                                                EST 5270
      IF (NZB.EQ.0) GO TO 850                                           EST 5280
      PUNCH 2070, NN,MM                                                 EST 5290
      PUNCH 2240                                                        EST 5300
  850 IF (NZB1.EQ.0) GO TO 860                                          EST 5310
      PUNCH 2100, NN,MM                                                 EST 5320
      PUNCH 2250                                                        EST 5330
  860 IF (NZB2.EQ.0) GO TO 870                                          EST 5340
      PUNCH 2130, NN,MM                                                 EST 5350
      PUNCH 2260                                                        EST 5360
  870 IF (NEI.EQ.0) GO TO 880                                           EST 5370
      PUNCH 2010, NN,MM                                                 EST 5380
      PUNCH 2220                                                        EST 5390
  880 IF (IS.EQ.2) KM=NN*LL                                             EST 5400
      IF (NZB.EQ.0) GO TO 1000                                          EST 5410
      NM=KM                                                             EST 5420
      IF (NN*MM.GT.54) NM=54                                            EST 5430
      PUNCH 2080, ID,NM                                                 EST 5440
      PUNCH 2090, ID                                                    EST 5450
      ICNT=0                                                            EST 5460
      DO 990 I=1,KM,6                                                   EST 5470
      I6=I+5                                                            EST 5480
      ICNT=ICNT+1                                                       EST 5490
      IP=I                                                              EST 5500
      IF ((I6.LT.KM).OR.(ICNT.EQ.10)) GO TO 950                         EST 5510
  890 I6=KM                                                             EST 5520
      KI=KM-I+1                                                         EST 5530
      GO TO (900,910,920,930,940), KI                                   EST 5540
  900 PUNCH 1880, ICNT,(ZB1D(K),K=IP,I6)                                EST 5550
      GO TO 980                                                         EST 5560
  910 PUNCH 1890, ICNT,(ZB1D(K),K=IP,I6)                                EST 5570
      GO TO 980                                                         EST 5580
  920 PUNCH 1900, ICNT,(ZB1D(K),K=IP,I6)                                EST 5590
      GO TO 980                                                         EST 5600
  930 PUNCH 1910, ICNT,(ZB1D(K),K=IP,I6)                                EST 5610
      GO TO 980                                                         EST 5620
  940 PUNCH 1920, ICNT,(ZB1D(K),K=IP,I6)                                EST 5630
      GO TO 980                                                         EST 5640
  950 IF (ICNT.LT.10) GO TO 960                                         EST 5650
      ID=ID+1                                                           EST 5660
      NM=54                                                             EST 5670
      IF ((ID)*54.GT.KM) NM=KM-(ID-1)*54                                EST 5680
      PUNCH 2080, ID,NM                                                 EST 5690
      PUNCH 2090, ID                                                    EST 5700
      ICNT=1                                                            EST 5710
      IF (I6.GT.KM) GO TO 890                                           EST 5720
      GO TO 970                                                         EST 5730
  960 IF (ICNT.NE.9) GO TO 970                                          EST 5740
      PUNCH 1930, ICNT,(ZB1D(K),K=I,I6)                                 EST 5750
      GO TO 980                                                         EST 5760
  970 PUNCH 1870, ICNT,(ZB1D(K),K=I,I6)                                 EST 5770
  980 CONTINUE                                                          EST 5780
  990 CONTINUE                                                          EST 5790
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1000 IF (NEI.EQ.0) GO TO 1120                                    EST 5800
     NM=KM                                                       EST 5810
     IF (NN*MM.GT.54) NM=54                                      EST 5820
     ID=1                                                        EST 5830
     PUNCH 2020, ID,NM                                           EST 5840
     PUNCH 2030, ID                                              EST 5850
     ICNT=0                                                      EST 5860
     DO 1110 I=1,KM,6                                            EST 5870
     I6=I+5                                                      EST 5880
     ICNT=ICNT+1                                                 EST 5890
     IP=I                                                        EST 5900
     IF ((I6.LT.KM).OR.(ICNT.EQ.10)) GO TO 1070                  EST 5910
1010 I6=KM                                                       EST 5920
     KI=KM-I+1                                                   EST 5930
     GO TO (1020,1030,1040,1050,1060), KI                        EST 5940
1020 PUNCH 1880, ICNT,(EILN1D(K),K=IP,I6)                        EST 5950
     GO TO 1100                                                  EST 5960
1030 PUNCH 1890, ICNT,(EILN1D(K),K=IP,I6)                        EST 5970
     GO TO 1100                                                  EST 5980
1040 PUNCH 1900, ICNT,(EILN1D(K),K=IP,I6)                        EST 5990
     GO TO 1100                                                  EST 6000
1050 PUNCH 1910, ICNT,(EILN1D(K),K=IP,I6)                        EST 6010
     GO TO 1100                                                  EST 6020
1060 PUNCH 1920, ICNT,(EILN1D(K),K=IP,I6)                        EST 6030
     GO TO 1100                                                  EST 6040
1070 IF (ICNT.LT.10) GO TO 1080                                  EST 6050
     ID=ID+1                                                     EST 6060
     NM=54                                                       EST 6070
     IF ((ID)*54.GT.KM) NM=KM-(ID-1)*54                          EST 6080
     PUNCH 2020, ID,NM                                           EST 6090
     PUNCH 2030, ID                                              EST 6100
     ICNT=1                                                      EST 6110
     IF (I6.GT.KM) GO TO 1010                                    EST 6120
     GO TO 1090                                                  EST 6130
1080 IF (ICNT.NE.9) GO TO 1090                                   EST 6140
     PUNCH 1930, ICNT,(EILN1D(K),K=I,I6)                         EST 6150
     GO TO 1100                                                  EST 6160
1090 PUNCH 1870, ICNT,(EILN1D(K),K=I,I6)                         EST 6170
1100 CONTINUE                                                    EST 6180
1110 CONTINUE                                                    EST 6190
     KM=NN*MM                                                    EST 6200
1120 IF (NNB.EQ.0) GO TO 1240                                    EST 6210
     KM=NN*MM                                                    EST 6220
     NM=KM                                                       EST 6230
     IF (NN*MM.GT.54) NM=54                                      EST 6240
     ID=1                                                        EST 6250
     PUNCH 2050, ID,NM                                           EST 6260
     PUNCH 2060, ID                                              EST 6270
     ICNT=0                                                      EST 6280
     DO 1230 I=1,KM,6                                            EST 6290
     I6=I+5                                                      EST 6300
     ICNT=ICNT+1                                                 EST 6310
     IP=I                                                        EST 6320
     IF ((I6.LT.KM).OR.(ICNT.EQ.10)) GO TO 1190                  EST 6330
1130 I6=KM                                                       EST 6340
     KI=KM-I+1                                                   EST 6350
     GO TO (1140,1150,1160,1170,1180), KI                        EST 6360
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1140 PUNCH 1880, ICNT,(NB1D(K),K=IP,I6)
     GO TO 1220
1150 PUNCH 1890, ICNT,(NB1D(K),K=IP,I6)
     GO TO 1220
1160 PUNCH 1900, ICNT,(NB1D(K),K=IP,I6)
     GO TO 1220
1170 PUNCH 1910, ICNT,(NB1D(K),K=IP,I6)
     GO TO 1220
1180 PUNCH 1920, ICNT,(NB1D(K),K=IP,I6)
     GO TO 1220
1190 IF (ICNT.LT.10) GO TO 1200
     ID=ID+1
     NM=54
     IF ((ID)*54.GT.KM) NM=KM-(ID-1)*54
     PUNCH 2050, ID,NM
     PUNCH 2060, ID
     ICNT=1
     IF (I6.GT.KM) GO TO 1130
     GO TO 1210
1200 IF (ICNT.NE.9) GO TO 1210
     PUNCH 1930, ICNT,(NB1D(K),K=I,I6)
     GO TO 1220
1210 PUNCH 1870, ICNT,(NB1D(K),K=I,I6)
1220 CONTINUE
1230 CONTINUE
1240 IF (NED.EQ.0) GO TO 1360
     NM=KM
     IF (NN*MM.GT.54) NM=54
     ID=1
     PUNCH 1990, ID,NM
     PUNCH 2000, ID
     ICNT=0
     DO 1350 I=1,KM,6
     I6=I+5
     ICNT=ICNT+1
     IP=I
     IF ((I6.LT.KM).OR.(ICNT.EQ.10)) GO TO 1310
1250 I6=KM
     KI=KM-I+1
     GO TO (1260,1270,1280,1290,1300), KI
1260 PUNCH 1880, ICNT,(EDLN1D(K),K=IP,I6)
     GO TO 1340
1270 PUNCH 1890, ICNT,(EDLN1D(K),K=IP,I6)
     GO TO 1340
1280 PUNCH 1900, ICNT,(EDLN1D(K),K=IP,I6)
     GO TO 1340
1290 PUNCH 1910, ICNT,(EDLN1D(K),K=IP,I6)
     GO TO 1340
1300 PUNCH 1920, ICNT,(EDLN1D(K),K=IP,I6)
     GO TO 1340
1310 IF (ICNT.LT.10) GO TO 1320
     ID=ID+1
     NM=54
     IF ((ID)*54.GT.KM) NM=KM-(ID-1)*54
     PUNCH 1990, ID,NM
     PUNCH 2000, ID
     ICNT=1
```

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      IF (I6.GT.KM) GO TO 1250
      GO TO 1330
 1320 IF (ICNT.NE.9) GO TO 1330
      PUNCH 1930, ICNT,(EDLN1D(K),K=I,I6)
      GO TO 1340
 1330 PUNCH 1870,ICNT, (EDLN1D(K),K=I,I6)
 1340 CONTINUE
 1350 CONTINUE
      IF (IS.EQ.2) KM=NN*LL
 1360 IF (NZB1.EQ.0) GO TO 1480
      NM=KM
      IF (NN*MM.GT.54) NM=54
      ID=1
      PUNCH 2110, ID,NM
      PUNCH 2120, ID
      ICNT=0
      DO 1470 I=1,KM,6
      I6=I+5
      ICNT=ICNT+1
      IP=I
      IF ((I6.LT.KM).OR.(ICNT.EQ.10)) GO TO 1430
 1370 I6=KM
      KI=KM-I+1
      GO TO (1380,1390,1400,1410,1420), KI
 1380 PUNCH 1880, ICNT,(ZB11D(K),K=IP,I6)
      GO TO 1460
 1390 PUNCH 1890, ICNT,(ZB11D(K),K=IP,I6)
      GO TO 1460
 1400 PUNCH 1900, ICNT,(ZB11D(K),K=IP,I6)
      GO TO 1460
 1410 PUNCH 1910, ICNT,(ZB11D(K),K=IP,I6)
      GO TO 1460
 1420 PUNCH 1920, ICNT,(ZB11D(K),K=IP,I6)
      GO TO 1460
 1430 IF (ICNT.LT.10) GO TO 1440
      ID=ID+1
      NM=54
      IF ((ID)*54.GT.KM) NM=KM-(ID-1)*54
      PUNCH 2110, ID,NM
      PUNCH 2120, ID
      ICNT=1
      IF (I6.GT.KM) GO TO 1370
      GO TO 1450
 1440 IF (ICNT.NE.9) GO TO 1450
      PUNCH 1930, ICNT,(ZB11D(K),K=I,I6)
      GO TO 1460
 1450 PUNCH 1870, ICNT,(ZB11D(K),K=I,I6)
 1460 CONTINUE
 1470 CONTINUE
 1480 IF (NZB2.EQ.0) GO TO 1600
      NM=KM
      IF (NN*MM.GT.54) NM=54
      ID=1
      PUNCH 2140, ID,NM
      PUNCH 2150, ID
      DO 1590 I=1,KM,6
      I6=I+5
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      ICNT=ICNT+1                                                       EST 7510
      IP=I                                                              EST 7520
      IF ((I6.LT.KM).OR.(ICNT.EQ.10)) GO TO 1550                        EST 7530
 1490 I6=KM                                                             EST 7540
      KI=KM-I+1                                                         EST 7550
      GO TO (1500,1510,1520,1530,1540), KI                              EST 7560
 1500 PUNCH 1880, ICNT,(ZB21D(K),K=IP,I6)                               EST 7570
      GO TO 1580                                                        EST 7580
 1510 PUNCH 1890, ICNT,(ZB21D(K),K=IP,I6)                               EST 7590
      GO TO 1580                                                        EST 7600
 1520 PUNCH 1900, ICNT,(ZB21D(K),K=IP,I6)                               EST 7610
      GO TO 1580                                                        EST 7620
 1530 PUNCH 1910, ICNT,(ZB21D(K),K=IP,I6)                               EST 7630
      GO TO 1580                                                        EST 7640
 1540 PUNCH 1920, ICNT,(ZB21D(K),K=IP,I6)                               EST 7650
      GO TO 1580                                                        EST 7660
 1550 IF (ICNT.LT.10) GO TO 1560                                        EST 7670
      ID=ID+1                                                           EST 7680
      NM=54                                                             EST 7690
      IF ((ID)*54.GT.KM) NM=KM-(ID-1)*54                                EST 7700
      PUNCH 2140, ID,NM                                                 EST 7710
      PUNCH 2150, ID                                                    EST 7720
      ICNT=1                                                            EST 7730
      IF (I6.GT.KM) GO TO 1490                                          EST 7740
      GO TO 1570                                                        EST 7750
 1560 IF (ICNT.NE.9) GO TO 1570                                         EST 7760
      PUNCH 1930, ICNT,(ZB21D(K),K=I,I6)                                EST 7770
      GO TO 1580                                                        EST 7780
 1570 PUNCH 1870, ICNT,(ZB21D(K),K=I,I6)                                EST 7790
 1580 CONTINUE                                                          EST 7800
 1590 CONTINUE                                                          EST 7810
 1600 CONTINUE                                                          EST 7820
 1610 CONTINUE                                                          EST 7840
C     MAKE NTRAN TAPE
      IF (NED.EQ.1) GO TO 1630                                          EST 7850
      DO 1620 K=1,1594                                                  EST 7860
 1620 EDLN1D(K)=0.0                                                     EST 7870
 1630 IF (NEI.EQ.1) GO TO 1650                                          EST 7880
      DO 1640 K=1,1595                                                  EST 7890
 1640 EILN1D(K)=0.0                                                     EST 7900
 1650 IF (NNB.EQ.1) GO TO 1670                                          EST 7910
      DO 1660 K=1,1594                                                  EST 7920
 1660 NB1D(K)=0.0                                                       EST 7930
 1670 IF (NZB.EQ.1) GO TO 1690                                          EST 7940
      DO 1680 K=1,1595                                                  EST 7950
 1680 ZB1D(K)=0.0                                                       EST 7960
 1690 IF (NZB1.EQ.1) GO TO 1710                                         EST 7970
      DO 1700 K=1,1594                                                  EST 7980
 1700 ZB11D(K)=0.0                                                      EST 7990
 1710 IF (NZB2.EQ.1) GO TO 1730                                         EST 8000
      DO 1720 K=1,1594                                                  EST 8010
 1720 ZB21D(K)=0.0                                                      EST 8020
 1730 CONTINUE                                                          EST 8030
      IF (ND11.EQ.0) GO TO 1760                                         EST 8040
      LZ=LL                                                             EST 8050
      NX=NN                                                             EST 8060
      MX=MM                                                             EST 8070
```

```
      PHI=PHI
      IT=IS
      TAULZ=TAUL(1)
      ELZ=EL(1)
      EPRLZ=EPRL(1)
      I61=I6
      CALL NTRAN (11,1,9600,IT,LX)
 1740 IF (LX.EQ.-1) GO TO 1740
      IF (LX.LT.0) GO TO 1750
      END FILE 11
      REWIND 11
      GO TC 1760
 1750 S1=1.0655
      CALL ERR (S1)
 1760 CONTINUE
C           EDIT PRINTS
      IF (NNB.EQ.0) GO TO 1770
      WRITE (6,2290)
      WRITE (6,2380) (NB1D(K),K=1,KM)
 1770 IF (NED.EQ.0) GO TO 1780
      WRITE (6,2270)
      WRITE (6,2380) (EDLN1D(K),K=1,KM)
 1780 IF (IS.EQ.2) KM=NN*LL
      IF (NZB.EQ.0) GO TO 1790
      WRITE (6,2300)
      WRITE (6,2380) (ZB1D(K),K=1,KM)
 1790 IF (NEI.EQ.0) GO TO 1800
      WRITE (6,2280)
      WRITE (6,2380) (EILN1D(K),K=1,KM)
 1800 IF (NZB1.EQ.0) GO TO 1810
      WRITE (6,2310)
      WRITE (6,2380) (ZB11D(K),K=1,KM)
 1810 IF (NZB2.EQ.0) GO TO 1820
      WRITE (6,2380) (ZB21D(K),K=1,KM)
      WRITE (6,2320)
 1820 WRITE (6,2360)
      WRITE (6,2380) ((THETA(N,M),N=1,NN),M=1,MM)
      IF (IS.NE.2) GO TO 1830
      WRITE (6,2370)
      WRITE (6,2380) ((TH(N,L),N=1,NN),L=1,LL)
 1830 CONTINUE
      CALL EXIT
C
 1840 FORMAT (7E10.4)
 1850 FORMAT (14I5)
 1860 FORMAT (12A6)
 1870 FORMAT (5XI1,6(1F10.6,1H,))
 1880 FORMAT (5XI1,F10.6,1H/)
 1890 FORMAT (5XI1,F10.6,1H,F10.6,1H/)
 1900 FORMAT (5XI1,F10.6,2(1H,F10.6),1H/)
 1910 FORMAT (5XI1,F10.6,3(1H,F10.6),1H/)
 1920 FORMAT (5XI1,F10.6,4(1H,F10.6),1H/)
 1930 FORMAT (5XI1,F10.6,5(1H,F10.6),1H/)
 1940 FORMAT (5XI1,1PE10.4,5(1H,1PE10.4),1H/)
 1950 FORMAT (5XI1,1PE10.4,3(1H,1PE10.4),1H/)
 1960 FORMAT (5XI1,6(I3,1H,),I3,1H/)
 1970 FORMAT (5XI1,10(I3,1H,)I3,1H/)
```

```
1980 FORMAT (6X,14H DIMENSION ED(I2,1H,I2,1H))               EST 8640
1990 FORMAT (6X,14H COMMON/EST/EDI2,1H(I2,1H))                EST 8650
2000 FORMAT (6X,8H DATA EDI2,1H/)                             EST 8660
2010 FORMAT (6X,14H DIMENSION EI(I2,1H,I2,1H))               EST 8670
2020 FORMAT (6X,14H COMMON/EST/EII2,1H(I2,1H))                EST 8680
2030 FORMAT (6X,8H DATA EII2,1H/)                             EST 8690
2040 FORMAT (6X,14H DIMENSION NB(I2,1H,I2,1H))               EST 8700
2050 FORMAT (6X,14H COMMON/EST/NBI2,1H(I2,1H))                EST 8710
2060 FORMAT (6X,8H DATA NBI2,1H/)                             EST 8720
2070 FORMAT (6X,14H DIMENSION ZB(I2,1H,I2,1H))               EST 8730
2080 FORMAT (6X,14H COMMON/EST/ZBI2,1H(I2,1H))                EST 8740
2090 FORMAT (6X,8H DATA ZBI2,1H/)                             EST 8750
2100 FORMAT (6X,15H DIMENSION ZB1(I2,1H,I2,1H))              EST 8760
2110 FORMAT (6X,15H COMMON/EST/ZB1I2,1H(I2,1H))               EST 8770
2120 FORMAT (6X,9H DATA ZB1I2,1H/)                            EST 8780
2130 FORMAT (6X,15H DIMENSION ZB2(I2,1H,I2,1H))              EST 8790
2140 FORMAT (6X,15H COMMON/EST/ZB2I2,1H(I2,1H))               EST 8800
2150 FORMAT (6X,9H DATA ZB2I2,1H/)                            EST 8810
2160 FORMAT (6X,32H DATA TAUM,EM,EPRM,TAUZ,EZ,EPRZ/)          EST 8820
2170 FORMAT (6X,28H DATA TAULZ,ELZ,EPRLZ,R,S,T/)              EST 8830
2180 FORMAT (6X,22H DATA V1,VZ,PHI,NBMAX/)                    EST 8840
2190 FORMAT (6X,39H DATA NN,MM,LL,I1,I2,I3,I4,I5,I6,I7,I8/)   EST 8850
2200 FORMAT (6X,35H DATA IS,NED,NEI,NNB,NZB,NZB1,NZB2/)       EST 8860
2210 FORMAT (6X,21H EQUIVALENCE (ED,ED1))                     EST 8870
2220 FORMAT (6X,21H EQUIVALENCE (EI,EI1))                     EST 8880
2230 FORMAT (6X,21H EQUIVALENCE (NB,NB1))                     EST 8890
2240 FORMAT (6X,21H EQUIVALENCE (ZB,ZB1))                     EST 8900
2250 FORMAT (6X,23H EQUIVALENCE (ZB1,ZB11))                   EST 8910
2260 FORMAT (6X,23H EQUIVALENCE (ZB2,ZB12))                   EST 8920
2270 FORMAT (6H  EDLN)                                        EST 8930
2280 FORMAT (6H  EILN)                                        EST 8940
2290 FORMAT (6H  NBAR)                                        EST 8950
2300 FORMAT (6H  ZBAR)                                        EST 8960
2310 FORMAT (7H  ZBAR1)                                       EST 8970
2320 FORMAT (7H  ZBAR2)                                       EST 8980
2330 FORMAT (4H  EL)                                          EST 8990
2340 FORMAT (6H  EPRL)                                        EST 9000
2350 FORMAT (6H  TAUL)                                        EST 9010
2360 FORMAT (9H  E THETA)                                     EST 9020
2370 FORMAT (14H  EPRIME THETA)                               EST 9030
2380 FORMAT (1X,1P6E12.5)                                     EST 9040
2390 FORMAT (1H0,27H TAPE 10 DUMP  VALUE OF MS=I4)            EST 9050
2400 FORMAT (1H0,27H TAPE 10 DUMP  VALUE OF LS=I4)            EST 9060
2410 FORMAT (6X,24H DATA WT1,WT2,PAN1,PAN2/)
     END                                                      EST 9070
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```
C     THIS VERSION OF LIBEX FOR USE WITH DATA CARDS
C     DATA IS FOR CH2
      SUBROUTINE LIBEX(TAU, E, THA, P, ZBAR, GG, NBAR, SEDEI)
      EQUIVALENCE (Z(131),S1)
      REAL NB
      REAL NBMAX
      REAL NBAR
      COMMON  Z(10000)
      COMMON/BOB/ZPART(1200,3)
       DATA IS,NED,NEI,NNB,NZB,NZB1,NZB2/
     1  2,  1,  1,  1,  1,  0,  0/
       DATA TAUM,EH,EPRM,TAUZ,EZ,EPRZ/
     1 1.0000+09, 5.1587+12, 5.1587+12, 1.0000+00, 5.1587+09, 5.1587+09/
       DATA TAULZ,ELZ,EPRLZ,R,S,T/
     1 0.0000    , 9.7125+00, 9.7125+00, 6.0000+00, 3.0000+00, 6.0000+00/
       DATA V1,VZ,PHI,NBMAX/
     1 1.1256+01, 4.8984+02, 2.0675+11, 6.0000+00/
       DATA NN,MM,LL,I1,I2,I3,I4,I5,I6,I7,I8/
     1 28, 19, 19,  0,  1,  1,  1,  1,  1,  0,  0/
       DIMENSION NB(28,19)
       EQUIVALENCE (NB,NB1)
       DIMENSION ED(28,19)
       EQUIVALENCE (ED,ED1)
       DIMENSION ZB(28,19)
       EQUIVALENCE (ZB,ZB1)
       DIMENSION EI(28,19)
       EQUIVALENCE (EI,EI1)
       COMMON/EST/ZB 1(54)
       DATA ZB 1/
     1    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     2    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     3    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     4    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     5    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     6    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     7    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     8    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     9    .000000,   .000000,   .000000,   .000000,   .000000,   .000000/
       COMMON/EST/ZB 2(54)
       DATA ZB 2/
     1    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     2    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     3    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     4    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     5    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     6    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     7    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     8    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     9    .000000,   .000000,   .000000,   .000000,   .000000,   .000000/
       COMMON/EST/ZB 3(54)
       DATA ZB 3/
     1    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     2    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     3    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     4    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     5    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     6    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
     7    .000000,   .000000,   .000000,   .000000,   .000000,   .000000,
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8     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
9     .000000,    .000000,    .000000,    .000000,    .000000,    .000000/
      COMMON/EST/ZB 4(54)
      DATA ZB 4/
1     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
2     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
3     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
4     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
5     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
6     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
7     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
8     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
9     .000000,    .000000,    .000000,    .000000,    .000000,    .000000/
      COMMON/EST/ZB 5(54)
      DATA ZB 5/
1     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
2     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
3     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
4     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
5     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
6     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
7     .001375,    .000000,    .000000,    .000000,    .000000,    .000000,
8     .000000,    .000000,    .000000,    .000000,    .000000,    .000000,
9     .000000,    .000000,    .000000,    .000000,    .000000,    .001025/
      COMMON/EST/ZB 6(54)
      DATA ZB 6/
1     .001386,    .001845,    .002392,    .003171,    .003972,    .004863,
2     .005825,    .006842,    .007898,    .008980,    .002165,    .001453,
3     .001018,    .000000,    .000000,    .000000,    .000000,    .001017,
4     .001416,    .001966,    .002683,    .003581,    .004660,    .006132,
5     .007678,    .009392,    .011240,    .013183,    .015182,    .017221,
6     .019279,    .021328,    .023356,    .025352,    .027308,    .029587,
7     .031466,    .033289,    .003305,    .002510,    .002125,    .003008,
8     .004120,    .005563,    .007379,    .009542,    .012376,    .015347,
9     .018590,    .022033,    .025610,    .029260,    .032925,    .036567/
      COMMON/EST/ZB 7(54)
      DATA ZB 7/
1     .040154,    .043662,    .047073,    .050376,    .053563,    .056637,
2     .059574,    .062393,    .065092,    .067673,    .070141,    .072497,
3     .006451,    .008939,    .011798,    .015438,    .020100,    .025151,
4     .030705,    .036627,    .042780,    .049041,    .055305,    .061488,
5     .067552,    .073404,    .079059,    .084488,    .089684,    .094644,
6     .099369,    .103865,    .108140,    .112192,    .116055,    .119713,
7     .123183,    .126476,    .129601,    .132567,    .022550,    .029372,
8     .037760,    .046765,    .056490,    .066674,    .077067,    .087457,
9     .097672,    .107592,    .117154,    .126278,    .134955,    .143179/
      COMMON/EST/ZB 8(54)
      DATA ZB 8/
1     .150955,    .158299,    .165227,    .171791,    .178403,    .184369,
2     .190535,    .194808,    .199512,    .203055,    .206890,    .208952,
3     .212317,    .214984,    .055995,    .070481,    .086022,    .102427,
4     .119235,    .136026,    .152489,    .168387,    .183538,    .197870,
5     .211345,    .223981,    .236104,    .247291,    .256832,    .265029,
6     .272522,    .279397,    .285713,    .291530,    .296898,    .301848,
7     .306537,    .310995,    .315162,    .319057,    .322715,    .326150,
8     .111426,    .136153,    .162043,    .188504,    .214795,    .240392,
9     .264893,    .288068,    .309845,    .329440,    .346662,    .362322/
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      COMMON/EST/ZB 9(54)
      DATA ZB 9/
     1  .376563,   .389536,   .401388,   .412261,   .422231,   .431389,
     2  .439821,   .447598,   .454789,   .461449,   .467631,   .473380,
     3  .478736,   .483736,   .488411,   .492790,   .191916,   .230571,
     4  .270380,   .310347,   .349491,   .387092,   .421993,   .451410,
     5  .480242,   .506713,   .531402,   .553976,   .574697,   .593697,
     6  .607744,   .622505,   .635983,   .648317,   .659616,   .669992,
     7  .679541,   .688345,   .696480,   .704010,   .710996,   .717488,
     8  .723533,   .729172,   .297996,   .353707,   .411865,   .471231,
     9  .527633,   .577922,   .626699,   .671599,   .709234,   .744693/
      COMMON/EST/ZB10(46)
      DATA ZB10/
     1  .776754,   .805720,   .831883,   .855520,   .876885,   .896205,
     2  .913679,   .929478,   .943750,   .956630,   .968233,   .978674,
     3  .988055,   .996493,  1.004091,  1.010952,  1.017173,  1.022840,
     4  .425780,   .510008,   .594169,   .672576,   .744677,   .808484,
     5  .868860,   .922703,   .970060,  1.011201,  1.046563,  1.076752,
     6 1.103657,  1.123317,  1.141089,  1.160070,  1.173028,  1.184398,
     7 1.194515,  1.205969,  1.213874,  1.221149,  1.227891,  1.234171,
     8 1.240043,  1.245551,  1.250730,  1.255609/
      COMMON/EST/EI 1(54)
      DATA EI 1/
     1-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     2-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     3-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     4-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     5-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     6-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     7-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     8-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     9-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850/
      COMMON/EST/EI 2(54)
      DATA EI 2/
     1-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     2-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     3-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     4-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     5-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     6-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     7-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     8-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     9-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850/
      COMMON/EST/EI 3(54)
      DATA EI 3/
     1-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     2-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     3-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     4-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     5-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     6-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     7-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     8-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
     9-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850/
      COMMON/EST/EI 4(54)
      DATA EI 4/
     1-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
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2-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
3-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
4-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
5-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
6-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
7-23.025850,-23.025850,-23.025850,-23.025850,-19.121368,-23.025850,
8-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
9-23.025850,-23.025850,-19.121368,-23.025850,-23.025850,-23.025850/
  COMMON/EST/EI 5(54)
  DATA EI 5/
1-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
2-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
3-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
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5-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
6-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
7 -4.123382,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
8-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
9-23.025850,-23.025850,-23.025850,-23.025850,-23.025850, -4.457728/
  COMMON/EST/EI 6(54)
  DATA EI 6/
1 -4.156404, -3.870282, -3.610777, -3.328852, -3.103802, -2.901839,
2 -2.721497, -2.560797, -2.417514, -2.289392, -3.664721, -4.072567,
3 -4.435791,-23.025850,-23.025850,-18.428221,-23.025850,  -.912638,
4 -2.639282, -3.793462, -3.483021, -3.194972, -2.932156, -2.658109,
5 -2.433998, -2.233350, -2.054593, -1.896018, -1.755708, -1.630594,
6 -1.518587, -1.418454, -1.328422, -1.247146, -1.173510, -1.093992,
7 -1.033019,  -.977226, -3.236126, -3.519532,   .104213,  -.430702,
8 -1.580806, -2.732056, -2.450434, -2.194612, -1.935585, -1.721872,
9 -1.531787, -1.363589, -1.214971, -1.083603,  -.967472,  -.864430/
  COMMON/EST/EI 7(54)
  DATA EI 7/
1  -.772686,  -.690705,  -.617174,  -.550978,  -.491172,  -.436792,
2  -.387577,  -.342571,  -.301360,  -.263504,  -.228641,  -.196460,
3   .066419,  -.579267,  -.520131,  -.449692,  -.366256,  -.283425,
4  -.199950,  -.118360,  -.040473,   .032605,   .100362,   .162655,
5   .219855,   .271785,   .319244,   .362526,   .402032,   .438141,
6   .471202,   .501532,   .529415,   .555051,   .578817,   .600746,
7   .621071,   .639949,   .657516,   .673891,  -.316351,  -.208517,
8  -.090299,   .022297,   .130730,   .232470,   .326132,   .411246,
9   .487915,   .556665,   .618289,   .673331,   .722609,   .766817/
  COMMON/EST/EI 8(54)
  DATA EI 8/
1   .806570,   .842415,   .874831,   .904381,   .933264,   .958328,
2   .983668,  1.000055,  1.019479,  1.034641,  1.051086,  1.059490,
3  1.073742,  1.084852,   .137313,   .281975,   .416497,   .540818,
4   .653488,   .754180,   .843481,   .922304,   .991618,  1.052628,
5  1.106402,  1.153981,  1.197353,  1.235449,  1.267268,  1.295537,
6  1.320937,  1.343880,  1.364646,  1.383515,  1.400707,  1.416374,
7  1.431059,  1.444880,  1.457669,  1.469512,  1.480535,  1.490800,
8   .614286,   .768409,   .907450,  1.031708,  1.141222,  1.237120,
9  1.320736,  1.393595,  1.457297,  1.511792,  1.558882,  1.600401/
  COMMON/EST/EI 9(54)
  DATA EI 9/
1  1.637092,  1.669648,  1.698678,  1.724723,  1.748120,  1.769211,
2  1.788294,  1.805619,  1.821401,  1.835822,  1.849041,  1.861192,
3  1.872392,  1.882742,  1.892329,  1.901232,  1.055842,  1.212095,
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     4 1.350815, 1.472947, 1.579541, 1.672155, 1.752300, 1.816542,
     5 1.876708, 1.929510, 1.976725, 2.018240, 2.055015, 2.087660,
     6 2.111153, 2.135276, 2.156811, 2.176118, 2.193482, 2.209162,
     7 2.223371, 2.236290, 2.248074, 2.258856, 2.268749, 2.277853,
     8 2.286251, 2.294019, 1.443107, 1.597401, 1.736608, 1.860831,
     9 1.969935, 2.060713, 2.143033, 2.214076, 2.270280, 2.320675/
      COMMON/EST/EI10(46)
      DATA EI10/
     1 2.364231, 2.402053, 2.435059, 2.464010, 2.489531, 2.512136,
     2 2.532244, 2.550201, 2.566288, 2.580744, 2.593766, 2.605529,
     3 2.616178, 2.625862, 2.634700, 2.642804, 2.650271, 2.657184,
     4 1.771012, 1.937605, 2.089148, 2.219229, 2.329331, 2.419531,
     5 2.499551, 2.567096, 2.624108, 2.672329, 2.713255, 2.748209,
     6 2.779896, 2.803067, 2.824647, 2.848658, 2.865081, 2.880107,
     7 2.893955, 2.910217, 2.921626, 2.932306, 2.942338, 2.951782,
     8 2.960688, 2.969101, 2.977057, 2.984589/
      COMMON/EST/NB 1(54)
      DATA NB 1/
     1 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     2 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     3 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     4 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     5 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     6 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     7 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     8 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     9 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 5.991147/
      COMMON/EST/NB 2(54)
      DATA NB 2/
     1 5.980486, 5.969981, 6.000000, 6.000000, 6.000000, 6.000000,
     2 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     3 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     4 6.000000, 6.000000, 5.983711, 5.965959, 5.949257, 5.931445,
     5 5.917412, 5.902410, 5.889917, 5.877577, 5.865907, 5.855065,
     6 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     7 6.000000, 6.000000, 6.000000, 6.000000, 6.000000, 6.000000,
     8 5.977492, 5.948688, 5.918998, 5.891096, 5.865938, 5.843042,
     9 5.820780, 5.801593, 5.784027, 5.767848, 5.752925, 5.739068/
      COMMON/EST/NB 3(54)
      DATA NB 3/
     1 5.726187, 5.714162, 5.702917, 5.692377, 6.000000, 6.000000,
     2 6.000000, 6.000000, 5.993184, 5.963240, 5.926456, 5.892512,
     3 5.858166, 5.827527, 5.798051, 5.772375, 5.750608, 5.717156,
     4 5.687274, 5.660236, 5.635739, 5.611224, 5.591197, 5.572837,
     5 5.555954, 5.540375, 5.523215, 5.509963, 5.497633, 5.486130,
     6 5.475372, 5.465287, 6.000000, 5.884723, 5.789128, 5.749161,
     7 5.702450, 5.661340, 5.617487, 5.579817, 5.543010, 5.511750,
     8 5.483185, 5.455402, 5.429414, 5.403113, 5.374787, 5.349291,
     9 5.321200, 5.300475, 5.281584, 5.264278, 5.248366, 5.233685/
      COMMON/EST/NB 4(54)
      DATA NB 4/
     1 5.220089, 5.207475, 5.195733, 5.184776, 5.174527, 5.164920,
     2 5.774427, 5.509112, 5.400023, 5.350777, 5.300285, 5.252188,
     3 5.206642, 5.170256, 5.135800, 5.102584, 5.071138, 5.048096,
     4 5.023514, 5.001376, 4.968020, 4.944589, 4.923397, 4.904153,
     5 4.886592, 4.870502, 4.855705, 4.842050, 4.829411, 4.817677,
     6 4.806755, 4.796564, 4.787031, 4.778096, 5.266429, 5.013392,
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7  4.909512,  4.847803,  4.794539,  4.745758,  4.701477,  4.659396,
8  4.628836,  4.600563,  4.571672,  4.544541,  4.525727,  4.499321,
9  4.475782,  4.454619,  4.429255,  4.412327,  4.396876,  4.382717/
   COMMON/EST/NB 5(54)
   DATA NB 5/
1  4.3696[illegible]1,  4.357666,  4.346532,  4.336190,  4.326560,  4.317570,
2  4.309158,  4.301269,  4.647364,  4.422429,  4.316649,  4.257798,
3  4.204197,  4.156621,  4.114410,  4.076765,  4.040914,  4.015163,
4  3.993628,  3.969731,  3.947384,  3.924075,  3.903820,  3.885605,
5  3.869124,  3.854156,  3.840493,  3.827971,  3.816452,  3.805820,
6  3.795976,  3.786835,  3.778325,  3.770382,  3.762951,  3.755984,
7  3.961872,  3.771100,  3.675624,  3.613715,  3.561891,  3.517090,
8  3.478129,  3.443949,  3.413664,  3.385111,  3.366005,  3.347951,
9  3.329016,  3.309615,  3.292403,  3.276922,  3.262923,  3.250202/
   COMMON/EST/NB 6(54)
   DATA NB 6/
1  3.238593,  3.227954,  3.218169,  3.209140,  3.200782,  3.193022,
2  3.185799,  3.179059,  3.172754,  3.166845,  3.260791,  3.105434,
3  3.018090,  2.954007,  2.912544,  2.871745,  2.836886,  2.806756,
4  2.780412,  2.757115,  2.735633,  2.715104,  2.706939,  2.691247,
5  2.677219,  2.664603,  2.653195,  2.635510,  2.626666,  2.618545,
6  2.611059,  2.604136,  2.597715,  2.591743,  2.586174,  2.580969,
7  2.576092,  2.571515,  2.610354,  2.473933,  2.398627,  2.342306,
8  2.302062,  2.266039,  2.235741,  2.209899,  2.187573,  2.168051,
9  2.150787,  2.135353,  2.120403,  2.108415,  2.097903,  2.088431/
   COMMON/EST/NB 7(54)
   DATA NB 7/
1  2.079850,  2.072038,  2.064898,  2.058346,  2.052312,  2.046737,
2  2.041570,  2.036756,  2.032265,  2.028072,  2.024150,  2.020472,
3  2.022045,  1.914107,  1.850945,  1.800267,  1.761534,  1.734504,
4  1.708825,  1.687182,  1.668681,  1.652666,  1.638640,  1.626227,
5  1.615130,  1.605965,  1.597774,  1.590413,  1.583759,  1.577716,
6  1.572202,  1.567150,  1.562504,  1.5582[illegible]7,  1.554249,  1.550564,
7  1.547134,  1.543933,  1.540938,  1.5381[illegible],  1.528232,  1.452819,
8  1.396629,  1.353141,  1.320814,  1.293506,  1.276882,  1.255734,
9  1.240891,  1.228287,  1.217525,  1.208336,  1.200551,  1.192621/
   COMMON/EST/NB 8(54)
   DATA NB 8/
1  1.188851,  1.182839,  1.176976,  1.171536,  1.166144,  1.162256,
2  1.160911,  1.154866,  1.153557,  1.146557,  1.150168,  1.141086,
3  1.143772,  1.142307,  1.133658,  1.078449,  1.035555,  1.000000,
4  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
5  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
6  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
7  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
8  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
9  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000/
   COMMON/EST/NB 9(54)
   DATA NB 9/
1  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
2  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
3  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
4  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
5  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
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7  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
8  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,  1.000000,
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9 1.000000, 1.000000, 1.000000, 1.000000, 1.000000, 1.000000/
  COMMON/EST/NB10(46)
  DATA NB10/
1 1.000000, 1.000000, 1.000000, 1.000000, 1.000000, 1.000000,
2 1.000000, 1.000000, 1.000000, 1.000000, 1.000000, 1.000000,
3 1.000000, 1.000000, 1.000000, 1.000000, 1.000000, 1.000000,
4 1.000000, 1.000000, 1.000000, 1.000000, 1.000000, 1.000000,
5 1.000000, 1.000000, 1.000000, 1.000000, 1.000000, 1.000000,
6 1.000000, 1.000000, 1.000000, 1.000000, 1.000000, 1.000000,
7 1.000000, 1.000000, 1.000000, 1.000000, 1.000000, 1.000000,
8 1.000000, 1.000000, 1.000000, 1.000000/
  COMMON/EST/ED 1(54)
  DATA ED 1/
1-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
2-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
3-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
4-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
5-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
6-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
7-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
8-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
9-23.025850,-23.025850,-23.025850,-23.025850,-23.025850, 10.305801/
  COMMON/EST/ED 2(54)
  DATA ED 2/
1 20.097997, 20.530467,-23.025850,-23.025850,-23.025850,-23.025850,
2-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
3-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
4-23.025850,-23.025850, 19.916814, 20.656865, 21.058886, 21.362743,
5 21.551345, 21.720789, 21.843376, 21.951713, 22.044751, 22.124351,
6-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
7-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,-23.025850,
8 20.241250, 21.070132, 21.531683, 21.832401, 22.044519, 22.206105,
9 22.342554, 22.447567, 22.535428, 22.610470, 22.675360, 22.732338/
  COMMON/EST/ED 3(54)
  DATA ED 3/
1 22.782773, 22.827855, 22.868410, 22.905123,-23.025850,-23.025850,
2-23.025850,-23.025850, 19.044068, 20.734181, 21.433837, 21.819072,
3 22.102202, 22.303022, 22.465868, 22.589992, 22.685096, 22.816803,
4 22.922473, 23.010163, 23.084117, 23.153611, 23.207418, 23.254637,
5 23.296434, 23.333726, 23.373482, 23.403300, 23.430389, 23.455124,
6 23.477805, 23.498689,-23.025850, 21.890353, 22.510645, 22.691133,
7 22.870062, 23.006713, 23.136256, 23.236912, 23.327500, 23.399321,
8 23.461375, 23.518817, 23.570209, 23.620129, 23.671749, 23.716474,
9 23.764005, 23.797981, 23.828200, 23.855285, 23.879709, 23.901854/
  COMMON/EST/ED 4(54)
  DATA ED 4/
1 23.922042, 23.940506, 23.957470, 23.973113, 23.987585, 24.001014,
2 22.580582, 23.405189, 23.625866, 23.713911, 23.798289, 23.873883,
3 23.941716, 23.993572, 24.040944, 24.085149, 24.125771, 24.154830,
4 24.185207, 24.212041, 24.251589, 24.278768, 24.302944, 24.324577,
5 24.344062, 24.361708, 24.377766, 24.392445, 24.405915, 24.418321,
6 24.429785, 24.440413, 24.450292, 24.459500, 23.851949, 24.197536,
7 24.318583, 24.386276, 24.442516, 24.492412, 24.536482, 24.577367,
8 24.606486, 24.633023, 24.659757, 24.684526, 24.701519, 24.725123,
9 24.745932, 24.764461, 24.786451, 24.800999, 24.814191, 24.826211/
  COMMON/EST/ED 5(54)
  DATA ED 5/
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1 24.837209, 24.847313, 24.856628, 24.865246, 24.873240, 24.880678,
2 24.887616, 24.894103, 24.588887, 24.792328, 24.881439, 24.929529,
3 24.972501, 25.010030, 25.042877, 25.071836, 25.099140, 25.118591,
4 25.134759, 25.152602, 25.169194, 25.186408, 25.201293, 25.214621,
5 25.226637, 25.237513, 25.247411, 25.256459, 25.264762, 25.272409,
6 25.279475, 25.286025, 25.292113, 25.297786, 25.303086, 25.308049,
7 25.158447, 25.297273, 25.364861, 25.408134, 25.444063, 25.474929,
8 25.501639, 25.524976, 25.545588, 25.564967, 25.577907, 25.590116,
9 25.602902, 25.615984, 25.627576, 25.637990, 25.647399, 25.655942/
  COMMON/EST/ED 6(54)
  DATA ED 6/
1 25.663733, 25.670869, 25.677428, 25.683479, 25.689077, 25.694273,
2 25.699107, 25.703617, 25.707835, 25.711787, 25.648832, 25.752813,
3 25.811072, 25.853796, 25.881452, 25.908688, 25.931982, 25.952139,
4 25.969786, 25.985411, 25.999835, 26.013637, 26.019131, 26.029629,
5 26.039156, 26.047669, 26.055373, 26.067331, 26.073318, 26.078819,
6 26.083893, 26.088589, 26.092947, 26.097002, 26.100785, 26.104324,
7 26.107641, 26.110756, 26.084372, 26.177506, 26.229551, 26.268829,
8 26.297102, 26.322567, 26.344110, 26.362578, 26.378605, 26.392677,
9 26.405167, 26.416370, 26.427257, 26.436012, 26.443708, 26.450658/
  COMMON/EST/ED 7(54)
  DATA ED 7/
1 26.456966, 26.462720, 26.467988, 26.472829, 26.477295, 26.481427,
2 26.485260, 26.488836, 26.492177, 26.495296, 26.498221, 26.500964,
3 26.499791, 26.581421, 26.630316, 26.670218, 26.701148, 26.722969,
4 26.743887, 26.761664, 26.776970, 26.790305, 26.802049, 26.812495,
5 26.821876, 26.829655, 26.836631, 26.842920, 26.848619, 26.853810,
6 26.858557, 26.862916, 26.866932, 26.870645, 26.874088, 26.877290,
7 26.880275, 26.883066, 26.885679, 26.888131, 26.896804, 26.964134,
8 27.015860, 27.056895, 27.088007, 27.114718, 27.131180, 27.152348,
9 27.167362, 27.180217, 27.191270, 27.200766, 27.208852, 27.217130/
  COMMON/EST/ED 8(54)
  DATA ED 8/
1 27.221081, 27.227399, 27.233585, 27.239345, 27.245074, 27.249217,
2 27.250654, 27.257123, 27.258527, 27.266057, 27.262168, 27.271967,
3 27.269062, 27.270645, 27.280025, 27.341232, 27.390496, 27.432570,
4 27.088259, 27.113649, 27.134874, 27.152497, 27.167626, 27.180668,
5 27.192015, 27.201970, 27.210761, 27.218021, 27.224368, 27.230152,
6 27.235440, 27.240288, 27.244709, 27.248713, 27.252468, 27.255777,
7 27.259157, 27.261668, 27.264726, 27.266873, 27.269832, 27.272096,
8 27.283713, 27.341292, 27.391940, 27.432570, 27.432570, 27.432570,
9 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570/
  COMMON/EST/ED 9(54)
  DATA ED 9/
1 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
2 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
3 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
4 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
5 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
6 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
7 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
8 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
9 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570/
  COMMON/EST/ED10(46)
  DATA ED10/
1 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
2 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
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    3 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
    4 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
    5 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
    6 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
    7 27.432570, 27.432570, 27.432570, 27.432570, 27.432570, 27.432570,
    8 27.432570, 27.432570, 27.432570, 27.432570/
      MNZB = NZB1+NZB2
      IF (NZB.EQ.1.OR.MNZB.EQ.2) GO TO 5
      S1 = 10.005
      RETURN
    5 IF (NNB.NE.1) NBAR=1.0
      IF (NNB.NE.1) NBMAX=1.
      TAU1=TAU
      K=NBAR
      EO=E
      ZBAR1=ZPART(K,1)
      ZBAR2=ZPART(K,2)
      IF (E.GT.0.) GO TO 30
      IF (GG) 20,10,10
   10 ZBAR=0.
      ZBAR1=0.
      ZBAR2=0.
      ZPART(K,1)=ZBAR1
      ZPART(K,2)=ZBAR2
      IF (GG.EQ.1.) RETURN
   20 THA=1.E-3
      NBAR=NBMAX
      GO TO 400
   30 CONTINUE
      IF (GG) 120,40,40
   40 ALGT=ALOG10(TAU)
      ALGE=ALOG10(E)
      DLGT=ALGT-TAULZ
      DLGE=ALGE-ELZ
      AN=DLGT*S+1.
      AM=DLGE*T+1.
      IF (DLGT.LT.0.) AN=0.
      IF (DLGE.LT.0.) AM=0.
      N=IFIX(AN)
      M=IFIX(AM)
      IN=0
      EO=E
      IF (N.LE.0) GO TO 180
      IF (N.GE.NN) GO TO 190
      IF (M.LE.0) GO TO 370
      IF (M.GE.MM) GO TO 280
   50 CONTINUE
      DNLT=AN-AINT(AN)
      DMLE=AM-AINT(AM)
      K=(M-1)*NN+N
      KN=K+1
      KM=M*NN+N
      KNM=KM+1
      IF (NNB.EQ.0) GO TO 60
      NBAR=NB(K)+(NB(KN)-NB(K))*DNLT+(NB(KM)-NB(K))*DMLE+(NB(KNM)+NB(K)-
     1NB(KN)-NB(KM))*DMLE*DNLT
   60 IF (NED.EQ.0) GO TO 70
```

```
      EDIS=EDLN(K)+(EDLN(KN)-EDLN(K))*DNLT+(EDLN(KM)-EDLN(K))*DMLE+(EDLNLBX  670
     1(KNM)+EDLN(K)-EDLN(KN)-EDLN(KM))*DMLE*DNLT                        LBX  680
   70 IF (IS.NE.2) GO TO 90                                             LBX  690
      EPR=E-EXP(EDIS)                                                   LBX  700
      ALGEPR=ALOG10(EPR)                                                LBX  710
      DLGEPR=ALGEPR-EPRLZ                                               LBX  720
      AL=DLGEPR*R+1                                                     LBX  730
      IF (DLGEPR.LT.0.) AL=0.                                           LBX  740
      L=IFIX(AL)                                                        LBX  750
      IN=0                                                              LBX  760
      EPRO=EPR                                                          LBX  770
      IF (N.LE.0) GO TO 200                                             LBX  780
      IF (N.GE.NN) GO TO 210                                            LBX  790
      IF (L.LT.0) GO TO 410                                             LBX  800
      IF (L.GE.LL) GO TO 280                                            LBX  810
   80 CONTINUE                                                          LBX  820
      DLLEPR=AL-AINT(AL)                                                LBX  830
      K=(L-1)*NN+N                                                      LBX  840
      KN=K+1                                                            LBX  850
      KM=L*NN+N                                                         LBX  860
      KNM=KM+1                                                          LBX  870
      DMLE=DLLEPR                                                       LBX  880
   90 IF (NZB.EQ.0) GO TO 110
      ZBAR=ZB(K)+(ZB(KN)-ZB(K))*DNLT+(ZB(KM)-ZB(K))*DMLE+(ZB(KNM)+ZB(K)-LBX  900
     1ZB(KN)-ZB(KM))*DNLT*DMLE                                          LBX  910
  110 IF (NZB1.EQ.0) GO TO 140                                          LBX  950
      ZBAR1=ZB1(K)+(ZB1(KN)-ZB1(K))*DNLT+(ZB1(KM)-ZB1(K))*DMLE+(ZB1(KNM)LBX  960
     1+ZB1(K)-ZB1(KN)-ZB1(KM))*DNLT*DMLE                                LBX  970
      IF (NZB2.EQ.1) GO TO 140
      ZBAR2 = (ZBAR-WT1*ZBAR1)/WT2
      ZPART(K,1)=ZBAR1
      ZPART(K,2)=ZBAR2
      IF (GG.EQ.1) RETURN
  140 IF (NZB2.EQ.0) GO TO 145
      ZBAR2=ZB2(K)+(ZB2(KN)-ZB2(K))*DNLT+(ZB2(KM)-ZB2(K))*DMLE+(ZB2(KNM)LBX 1100
     1+ZB2(K)-ZB2(KN)-ZB2(KM))*DNLT*DMLE                                LBX 1110
      IF (NZB1.EQ.1) GO TO 141
      ZBAR1 = (ZBAR-WT2*ZBAR2)/WT1
      GO TO 142
  141 ZBAR = WT1*ZBAR1+WT2*ZBAR2
  142 ZPART(K,1)=ZBAR1
      ZPART(K,2)=ZBAR2
      IF (GG.EQ.1) RETURN
  145 IF (NEI.EQ.0) GO TO 146
      ALIN=EILN(K)+(EILN(KN)-EILN(K))*DNLT+(EILN(KM)-EILN(K))*DMLE+(EILNLBX  930
     1(KNM)+EILN(K)-EILN(KN)-EILN(KM))*DNLT*DMLE                        LBX  940
      GO TO 150
  146 ALIN1 = EIONIZ(PAN1,0.0,ZBAR1)
      ALIN2 = EIONIZ(PAN2,0.0,ZBAR2)
      ALIN = WT1*ALIN1+WT2*ALIN2
      ALIN = ALOG(ALIN)
  150 IF (IS.EQ.2) GO TO 160                                            LBX 1120
      THA=(EO-PHI*EXP(ALIN))/(1.5*PHI*(1./NBAR+ZBAR))                   LBX 1130
      GO TO 148
  160 THA=(EO-PHI*EXP(ALIN)-EXP(EDIS))/(1.5*PHI*(1./NBAR+ZBAR))         LBX 1150
  148 IF (THA) 147,147,170
  147 THA = 1.E-3
```

```
170 IF (IN.NE.0) GO TO (230,250,270,290,310,330,360,380), IN
    GO TO 400
180 IF (M.LE.0) GO TO 220
    IF (M.GE.MM) GO TO 260
    GO TO 240
190 IF (M.LE.0) GO TO 340
    IF (M.GE.MM) GO TO 300
    GO TO 320
200 IF (L.LE.0) GO TO 220
    IF (L.GE.LL) GO TO 260
    GO TO 240
210 IF (L.LE.0) GO TO 350
    IF (L.GE.LL) GO TO 300
220 CONTINUE
    IF (I1.EQ.1) GO TO 420
    ZBAR=0.
    NBAR=NBMAX
    THA=1.E-3
    GO TO 400
230 CONTINUE
    RETURN
240 CONTINUE
    IF (I2.EQ.1) GO TO 430
250 CONTINUE
    RETURN
260 CONTINUE
    IF (I3.EQ.1) GO TO 440
270 CONTINUE
    RETURN
280 CONTINUE
    IF (I4.EQ.1) GO TO 450
290 CONTINUE
    RETURN
300 CONTINUE
    IF (I5.EQ.1) GO TO 460
310 CONTINUE
    RETURN
320 TAU=.999*TAUM
    GO TO 30
330 CONTINUE
    RETURN
340 CONTINUE
    IF (I7.EQ.1) GO TO 470
    IN=7
    M=1
    N=NN
    EO=EZ
    GO TO 50
350 IF (I7.EQ.1) GO TO 470
    IN=7
    L=1
    N=NN
    EPRO=EPRZ
    GO TO 80
360 THAP=E*THA/EZ
    ZBAR=ZBAR*(THAP/THA)**.75*SQRT(TAUM/TAU)*EXP(V1*(THAP-THA)/(THA*TH
   1AP*2.))
```

```
      AIN=V1*ZBAR
      GO TO 390
  370 CONTINUE
      IF (I8.EQ.1) GO TO 480
      IN=8
      M=1
      E0=EZ
      GO TO 50
  380 THAP=E*THA/EZ
      ZBAR=ZBAR*(THAP/THA)**.75*EXP(V1*(THAP-THA)/(THA*THAP*2.))
      AIN=V1*ZBAR
  390 CONTINUE
      THA=(E/PHI-AIN)/(1.5*(1./NBAR+ZBAR))
  400 P=PHI*(1./NBAR+ZBAR)*THA/TAU1
C     SEDEI = SUM OF IONIZATION ENERGY AND DISSOCIATION ENERGY
      SEDEI=EXP(EDIS)+PHI*EXP(ALIN)
      RETURN
  410 CONTINUE
      IF (I8.EQ.1) GO TO 480
      IN=8
      L=1
      EPRO=EPRZ
      GO TO 80
  420 S1=16.0100
      GO TO 490
  430 S1=16.0200
      GO TO 490
  440 S1=16.0300
      GO TO 490
  450 S1=16.0400
      GO TO 490
  460 S1=16.0500
      GO TO 490
      S1=16.0600
      GO TO 490
  470 S1=16.0700
      GO TO 490
  480 S1=16.0800
  490 RETURN
      END
```

```
C     THIS VERSION OF LIBEX ADAPTED FOR USE WITH AN NTRAN TAPE
C     EQUIVALENCES WERE SET UP SPECIFICALLY FOR HECTIC
      SUBROUTINE LIBEX(TAU, E, THA, P, ZBAR, GG, NBAR, SEDEI)           LIBE  10
      EQUIVALENCE (Z(131),S1)                                           LBX   20
      EQUIVALENCE (Z(5001),IS),(Z(5002),NED),(Z(5003),NEI),(Z(5004),NNB)LBX   30
     1,(Z(5005),NZB),(Z(5006),NZB1),(Z(5007),NZB2),(Z(5008),TAUM),(Z(500LBX   40
     29),EM),(Z(5010),EPRM),(Z(5011),TAUZ),(Z(5012),EZ),(Z(5013),EPRZ), LBX   50
     3(Z(5014),TAULZ),(Z(5015),ELZ),(Z(5016),EPRLZ),(Z(5017),R),(Z(5018)LBX   60
     4,S),(Z(5019),T),(Z(5020),V1),(Z(5021),VZ),(Z(5022),PHI),(Z(5023),NLBX   70
     5BMAX),(Z(5024),NN),(Z(5025),MM),(Z(5026),LL),(Z(5027),I1),(Z(5028)LBX   80
     6,I2),(Z(5029),I3),(Z(5030),I4),(Z(5031),I5),(Z(5032),I6),(Z(5033),LBX   90
     7I7),(Z(5034),I8),(Z(5035),WT1),(Z(5036),WT2),(Z(5037),PAN1),
     8 Z(5038),PAN2)
      EQUIVALENCE (Z(5039),ZB),(Z(6633),EILN),(Z(8227),NB),(Z(9821),EDLNLBX  110
     1),(Z(11415),ZB1),(Z(13008),ZB2)                                   LBX  120
      REAL NB                                                           LBX  130
      REAL NBMAX                                                        LBX  140
      REAL NBAR                                                         LBX  150
      COMMON  Z(10000)                                                  LBX  160
      COMMON/BOB/ZPART(1200,3)                                          LBX  170
      DIMENSION ZB1D(1594),EILN1D(1594),NB1D(1594),EDLN1D(1594),ZB11D(15EST   90
     193),ZB21D(1593)
      MNZB = NZB1+NZB2
      IF (NZB.EQ.1.OR.MNZB.EQ.2) GO TO 5
      S1 = 10.005
      RETURN
    5 IF (NNB.NE.1) NBAR=1.0                                            LBX  200
      IF (NNB.NE.1) NBMAX=1.                                            LBX  210
      TAU1=TAU                                                          LBX  220
      K=NBAR                                                            LBX  230
      EO=E                                                              LBX  240
      ZBAR1=ZPART(K,1)                                                  LBX  250
      ZBAR2=ZPART(K,2)                                                  LBX  260
      IF (E.GT.0.) GO TO 30                                             LBX  270
      IF (GG) 20,10,10                                                  LBX  280
   10 ZBAR=0.                                                           LBX  290
      ZBAR1=0.                                                          LBX  300
      ZBAR2=0.                                                          LBX  310
      ZPART(K,1)=ZBAR1                                                  LBX  320
      ZPART(K,2)=ZBAR2                                                  LBX  330
      IF (GG.EQ.1.) RETURN                                              LBX  340
   20 THA=1.E-3                                                         LBX  350
      NBAR=NBMAX                                                        LBX  360
      GO TO 400                                                         LBX  370
   30 CONTINUE                                                          LBX  380
      IF (GG) 120,40,40                                                 LBX  390
   40 ALGT=ALOG10(TAU)                                                  LBX  400
      ALGE=ALOG10(E)                                                    LBX  410
      DLGT=ALGT-TAULZ                                                   LBX  420
      DLGE=ALGE-ELZ                                                     LBX  430
      AN=DLGT*S+1.                                                      LBX  440
      AM=DLGE*T+1.                                                      LBX  450
      IF (DLGT.LT.0.) AN=0.                                             LBX  460
      IF (DLGE.LT.0.) AM=0.                                             LBX  470
      N=IFIX(AN)                                                        LBX  480
      M=IFIX(AM)                                                        LBX  490
      IN=0                                                              LBX  500
      EO=E                                                              LBX  510
```

```
      IF (N.LE.0) GO TO 180                                              LBX  520
      IF (N.GE.NN) GO TO 190                                             LBX  530
      IF (M.LE.0) GO TO 370                                              LBX  540
      IF (M.GE.MM) GO TO 280                                             LBX  550
   50 CONTINUE                                                           LBX  560
      DNLT=AN-AINT(AN)                                                   LBX  570
      DMLE=AM-AINT(AM)                                                   LBX  580
      K=(M-1)*NN+N                                                       LBX  590
      KN=K+1                                                             LBX  600
      KM=M*NN+N                                                          LBX  610
      KNM=KM+1                                                           LBX  620
      IF (NNB.EQ.0) GO TO 60                                             LBX  630
      NBAR=NB(K)+(NB(KN)-NB(K))*DNLT+(NB(KM)-NB(K))*DMLE+(NB(KNM)+NB(K)-LBX  640
     1NB(KN)-NB(KM))*DMLE*DNLT                                           LBX  650
   60 IF (NED.EQ.0) GO TO 70                                             LBX  660
      EDIS=EDLN(K)+(EDLN(KN)-EDLN(K))*DNLT+(EDLN(KM)-EDLN(K))*DMLE+(EDLNLBX  670
     1(KNM)+EDLN(K)-EDLN(KN)-EDLN(KM))*DMLE*DNLT                         LBX  680
   70 IF (IS.NE.2) GO TO 90                                              LBX  690
      EPR=E-EXP(EDIS)                                                    LBX  700
      ALGEPR=ALOG10(EPR)                                                 LBX  710
      DLGEPR=ALGEPR-EPRLZ                                                LBX  720
      AL=DLGEPR*R+1                                                      LBX  730
      IF (DLGEPR.LT.0.) AL=0.                                            LBX  740
      L=IFIX(AL)                                                         LBX  750
      IN=0                                                               LBX  760
      EPR0=EPR                                                           LBX  770
      IF (N.LE.0) GO TO 200                                              LBX  780
      IF (N.GE.NN) GO TO 210                                             LBX  790
      IF (L.LT.0) GO TO 410                                              LBX  800
      IF (L.GE.LL) GO TO 280                                             LBX  810
   80 CONTINUE                                                           LBX  820
      DLLEPR=AL-AINT(AL)                                                 LBX  830
      K=(L-1)*NN+N                                                       LBX  840
      KN=K+1                                                             LBX  850
      KM=L*NN+N                                                          LBX  860
      KNM=KM+1                                                           LBX  870
      DMLE=DLLEPR                                                        LBX  880
   90 IF (NZB.EQ.0) GO TO 110                                            LBX  890
      ZBAR=ZB(K)+(ZB(KN)-ZB(K))*DNLT+(ZB(KM)-ZB(K))*DMLE+(ZB(KNM)+ZB(K)-LBX  900
     1ZB(KN)-ZB(KM))*DNLT*DMLE                                           LBX  910
  110 IF (NZB1.EQ.0) GO TO 140                                           LBX  950
      ZBAR1=ZB1(K)+(ZB1(KN)-ZB1(K))*DNLT+(ZB1(KM)-ZB1(K))*DMLE+(ZB1(KNM)LBX  960
     1+ZB1(K)-ZB1(KN)-ZB1(KM))*DNLT*DMLE                                 LBX  970
      IF (NZB2.EQ.1) GO TO 140
      ZBAR2 = (ZBAR-WT1*ZBAR1)/WT2
      ZPART(K,1)=ZBAR1
      ZPART(K,2)=ZBAR2
      IF (GG.EQ.1) RETURN                                                LBX 1010
  140 IF (NZB2.EQ.0) GO TO 145                                           LBX 1090
      ZBAR2=ZB2(K)+(ZB2(KN)-ZB2(K))*DNLT+(ZB2(KM)-ZB2(K))*DMLE+(ZB2(KNM)LBX 1100
     1+ZB2(K)-ZB2(KN)-ZB2(KM))*DNLT*DMLE                                 LBX 1110
      IF (NZB1.EQ.1) GO TO 141
      ZBAR1 = (ZBAR-WT2*ZBAR2)/WT1
      GO TO 142
  141 ZBAR = WT1*ZBAR1+WT2*ZBAR2
  142 ZPART(K,1)=ZBAR1
      ZPART(K,2)=ZBAR2
```

```
      IF (GG.EQ.1) RETURN
  145 IF (NEI.EQ.0) GO TO 146
      ALIN=EILN(K)+(EILN(KN)-EILN(K))*DNLT+(EILN(KM)-EILN(K))*DMLE+(EILNLBX  930
     1(KNM)+EILN(K)-EILN(KN)-EILN(KM))*DNLT*DMLE                        LBX  940
      GO TO 150
  146 ALIN1 = EIONIZ(PAN1,0.0,ZBAR1)
      ALIN2 = EIONIZ(PAN2,0.0,ZBAR2)
      ALIN = WT1*ALIN1+WT2*ALIN2
      ALIN = ALOG(ALIN)
  150 IF (IS.EQ.2) GO TO 160                                            LBX 1120
      THA=(EO-PHI*EXP(ALIN))/(1.5*PHI*(1./NBAR+ZBAR))                   LBX 1130
      GO TO 148
  160 THA=(EO-PHI*EXP(ALIN)-EXP(EDIS))/(1.5*PHI*(1./NBAR+ZBAR))         LBX 1150
  148 IF (THA) 147,147,170
  147 THA = 1.E-3
  170 IF (IN.NE.0) GO TO (230,250,270,290,310,330,360,380), IN          LBX 1160
      GO TO 400                                                         LBX 1170
  180 IF (M.LE.0) GO TO 220                                             LBX 1180
      IF (M.GE.MM) GO TO 260                                            LBX 1190
      GO TO 240                                                         LBX 1200
  190 IF (M.LE.0) GO TO 340                                             LBX 1210
      IF (M.GE.MM) GO TO 300                                            LBX 1220
      GO TO 320                                                         LBX 1230
  200 IF (L.LE.0) GO TO 220                                             LBX 1240
      IF (L.GE.LL) GO TO 260                                            LBX 1250
      GO TO 240                                                         LBX 1260
  210 IF (L.LE.0) GO TO 350                                             LBX 1270
      IF (L.GE.LL) GO TO 300                                            LBX 1280
  220 CONTINUE                                                          LBX 1290
      IF (I1.EQ.1) GO TO 420                                            LBX 1300
      ZBAR=0.                                                           LBX 1310
      NBAR=NBMAX                                                        LBX 1320
      THA=1.E-3                                                         LBX 1330
      GO TO 400                                                         LBX 1340
  230 CONTINUE                                                          LBX 1350
      RETURN                                                            LBX 1360
  240 CONTINUE                                                          LBX 1370
      IF (I2.EQ.1) GO TO 430                                            LBX 1380
  250 CONTINUE                                                          LBX 1390
      RETURN                                                            LBX 1400
  260 CONTINUE                                                          LBX 1410
      IF (I3.EQ.1) GO TO 440                                            LBX 1420
  270 CONTINUE                                                          LBX 1430
      RETURN                                                            LBX 1440
  280 CONTINUE                                                          LBX 1450
      IF (I4.EQ.1) GO TO 450                                            LBX 1460
  290 CONTINUE                                                          LBX 1470
      RETURN                                                            LBX 1480
  300 CONTINUE                                                          LBX 1490
      IF (I5.EQ.1) GO TO 460                                            LBX 1500
  310 CONTINUE                                                          LBX 1510
      RETURN                                                            LBX 1520
  320 TAU=.999*TAUM                                                     LBX 1530
      GO TO 30                                                          LBX 1540
  330 CONTINUE                                                          LBX 1550
      RETURN                                                            LBX 1560
  340 CONTINUE                                                          LBX 1570
```

```
      IF (I7.EQ.1) GO TO 470
      IN=7
      M=1
      N=NN
      E0=EZ
      GO TO 50
  350 IF (I7.EQ.1) GO TO 470
      IN=7
      L=1
      N=NN
      EPRO=EPRZ
      GO TO 80
  360 THAP=E*THA/EZ
      ZBAR=ZBAR*(THAP/THA)**.75*SQRT(TAUM/TAU)*EXP(V1*(THAP-THA)/(THA*TH
     1AP*2.))
      AIN=V1*ZBAR
      GO TO 390
  370 CONTINUE
      IF (I8.EQ.1) GO TO 480
      IN=8
      M=1
      E0=EZ
      GO TO 50
  380 THAP=E*THA/EZ
      ZBAR=ZBAR*(THAP/THA)**.75*EXP(V1*(THAP-THA)/(THA*THAP*2.))
      AIN=V1*ZBAR
  390 CONTINUE
      THA=(E/PHI-AIN)/(1.5*(1./NBAR+ZBAR))
  400 P=PHI*(1./NBAR+ZBAR)*THA/TAU1
C     SEDEI = SUM OF IONIZATION ENERGY AND DISSOCIATION ENERGY
      SEDEI=EXP(EDIS)+PHI*EXP(AIN)
      RETURN
  410 CONTINUE
      IF (I8.EQ.1) GO TO 480
      IN=8
      L=1
      EPRO=EPRZ
      GO TO 80
  420 S1=16.0100
      GO TO 490
  430 S1=16.0200
      GO TO 490
  440 S1=16.0300
      GO TO 490
  450 S1=16.0400
      GO TO 490
  460 S1=16.0500
      GO TO 490
      S1=16.0600
      GO TO 490
  470 S1=16.0700
      GO TO 490
  480 S1=16.0800
  490 RETURN
      END
```

```
      REAL FUNCTION EIONIZ(A, B, C)
C
C     FUNCTION TO COMPUTE IONIZATION ENERGY
C     COMPILED MARCH 9, 1967, BY CHRIS IMES
C     MODIFICATION OF CODING DONE BY GARY LANE ON MAY 6,1966, FOR EIONMS
C       AND EIONF3
C
      Z = A
      PHI = B
      ZBAR = C
C
C     OPTION TO INCLUDE PHI IN CALCULATIONS
C       IF (PHI .EQ. 0.)   PHI IS SET TO 1.
C       IF (PHI .NE. 0.)   PHI IS USED IN CALCULATIONS
C
      IF (PHI .EQ. 0.)
     ' PHI = 1.
C
      COMMON /LMSB/U(1)
      DATA MARIMX/11/
      DATA ERROR/0./
C
      J1 = 1
      IZK = IFIX(Z + .5)
C
  400 CONTINUE
C     START SEARCHING THE MARI DECK TO FIND THE DESIRED Z
      IL = IFIX(U(J1) + .5)
      IF (IZK .EQ. IL)
     ' GO TO 401
      J1 = J1 + IL + 2
      IF (J1 .GT. MARIMX)
     ' GO TO 800
      GO TO 400
C
  401 CONTINUE
C     ATOMIC NUMBER OF DESIRED ELEMENT HAS BEEN LOCATED IN MARI
      IF (ZBAR .GT. (U(J1) - .5))
     ' GO TO 410
      GL = ZBAR
      LAG = GL
      GAL = GL - FLOAT(LAG)
C
C     J2 IS THE NUMBER OF IONIZATION POTENTIALS FOR THE ELEMENT
      IF (GAL .GT. .5)
     ' J2 = LAG + 2
      IF (GAL .LE. .5)
     ' J2 = LAG + 1
      GO TO 420
C
  410 CONTINUE
      J2 = IZK
C
  420 CONTINUE
C     J3 DETERMINES THE LOCATION OF THE HIGHEST POTENTIAL FOR THE
C     ELEMENT
      J3 = J1 + J2 + 1
      XI = PHI*(1. + ZBAR)
```

```
      IF (J2 .EQ. 1)
     ' GO TO 430
      IF (J2 .EQ. IZK)
     ' GO TO 440
C
C     J2.NE.1 .AND. J2.NE.Z, MID-PATH
      TLMS4 = J2
      TLMS13 = U(J3) - U(J3 - 1)
      SIGMA = ((ZBAR - TLMS4 + 1.5)**2)*TLMS13/2.*PHI + U(J3 - 1)*(XI -
     ' TLMS4*PHI)
      GO TO 500
C
  430 CONTINUE
C     J2.EQ.1  LOW PATH
      XBAR = ZBAR
      GO TO 450
C
  440 CONTINUE
C     J2 .EQ. IZK, HIGH PATH
      XBAR = ZBAR - U(J1) + 1.
C
  450 CONTINUE
C     COMPUTE SIGMA FOR LOW PATH AND HIGH PATH
      SIGMA = XBAR*U(J3)*PHI
C
  500 CONTINUE
C     SUM ALL LOWER POTENTIALS
      TLMS14 = 0.
      IF (J2 .EQ. 1)
     ' GO TO 480
      J6 = J2 - 1
      DO 475 J4 = 1, J6
      J7 = J1 + J4 + 1
      TLMS14 = TLMS14 + U(J7)
  475 CONTINUE
C
  480 CONTINUE
C     DETERMINE TOTAL IONIZATION ENERGY
      ENERGY = TLMS14*PHI
C
      EIONIZ = ENERGY + SIGMA
      RETURN
C
C
  800 CONTINUE
C     ERROR IS SET IF A NEEDED ELEMENT HAS BEEN LEFT OUT OF THE
C       MARI DECK
      ERROR = 18.0800
C     CALL DUMP
      RETURN
      CALL MARI
      RETURN
      END
      SUBROUTINE ERR(S1)
    3 FORMAT (6H S1 = F10.4)
      WRITE(6,3) S1
      CALL EXIT
```

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REFERENCES

1. Schalit, L. M., "Material Properties," Defense Atomic Support Agency Report GA-7760, v. IV, Gulf General Atomic Incorporated, to be published.
2. Stewart, J. C., and K. D. Pyatt, Jr., "A Theoretical Study of Optical Properties," Air Force Special Weapons Center Report AFSWC-TR-61-71, v. I. 1961.
3. Walsh, R. T., "DIAPHANOUS II," General Dynamics, General Atomic Division Informal Report GAMD-5549, 1964 (AD 453-351L).
4. Pyatt, K. D., "Nuclear Explosion Interaction Studies," v. II, "Methods of Analysis of Thermal Phenomena," Air Force Weapons Laboratory Report AFWL-TR-66-108, General Dynamics, General Atomic Division, 1967.
5. Allen, C. W., Astrophysical Quantities, (3rd ed), Athlone Press, University of London, 1955.
6. Garstang, R. H., "The Physical Constants Relating to Atomic Spectra," International Astronomical Union Symposium, No. 26, University of Colorado, Boulder, 1966, pp. 57-76.
7. Moore, C. E., Atomic Energy Levels as Derived from the Analysis of Optical Spectra, Circular of the National Bureau of Standards 467, v. I 1949, v. II 1952, v. III 1958.
8. Wagman, D. D., et al., "Selected Values of Chemical Thermodynamic Properties," National Bureau of Standards, Part I, NBS-TN-270-1, 1965; Part II, NBS-TN-270-2, 1966.
9. Stewart, J. C., and M. Rotenberg, "Wave Functions and Transition Probabilities in Scaled Thomas-Fermi Ion Potentials," Phys. Rev. 140 A1508, 1965.

10. Lotz, W., "Ionization Potentials of Atoms and Ions from H to N," Institut fur Plasma Physik, Garching bei München, Germany, 1966.

11. Brenner, S., and G. E. Brown, "Calculations of K Absorption Edges in Some Heavy Atoms," Proc. Roy. Soc. (London) Series A 218, 422 (1953).

12. Welch, J. E., "Visual Display Subroutines," General Dynamics, General Atomic Division, GAMD-8051, 1967, unpublished data.

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13. ABSTRACT

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The work covered by this volume falls into three parts: (1) opacity data generated by the DIAPHANOUS code; (2) equation-of-state data generated by the SPUTTER/HECTIC subroutines AIRMOL and CMOL and the MARIER, HELAS, and HELIKE ionization potential routines; (3) descriptions of codes used to transfer data between LASL, AFWL, Gulf General Atomic, and the DASA Analysis and Information Center (DASIAC).

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